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COMMON CONGENITAL LESIONS OF THE URINARY TRACT

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It is not intended here to present a report on the infinite varieties of congenital anomalies of the urinary tract, but rather to outline a plan of management of two large groups of patients, namely, those with congenital obstructive lesions and those with exstrophy of the bladder, hypospadias or epispadias.

CONGENITAL OBSTRUCTIVE LESIONS

Congenital lesions producing obstruction to the outflow of urine may be found at any point in the urinary tract from the ureteropelvic junction to the urethral meatus. Since they are frequently multiple, it is of utmost importance for one to study all parts of the tract thoroughly before instituting a plan of therapy. Surgical relief of obstruction in the upper urinary tract may well be nullified by a comparatively innocent-looking lesion at a lower level. Most commonly, obstructing lesions will be found at or near the ureteropelvic or ureterovesical junction and at the vesical neck.

Congenital obstructions at the ureteropelvic junction are of three general types, although any combination of these may be found in a single patient. They are as follows: (1) high insertion of the ureter above the most dependent portion of the pelvis, (2) intrinsic narrowing of the ureteropelvic junction and (3) aberrant vessels, fibrous bands or both, compressing the ureter at or just below the ureteropelvic junction. Here again the possibility of multiple lesions demands careful evaluation of the entire urinary tract.

Obstructions at the ureteropelvic junction may occasionally reach clinical proportions in childhood. Most patients, however, will tolerate the lesion until young adulthood when pain, recurrent pyelonephritis or a mass in the flank will precipitate investigation. Adequate urologic examination should reveal the site of the lesion, whether it is unilateral or bilateral and important clues as to its inherent nature. If it is unilateral, estimation of the function of the involved kidney is necessary before a decision for or against a conservative surgical procedure can be made. As a rule, if the affected kidney possesses less than one fourth of its function, the other kidney will usually have undergone compensatory hypertrophy, and nephrectomy will be required. In borderline cases, ultimate evaluation should be deferred until the kidney is exposed at the operating table. Young persons in whom evaluation is equivocal should be given the advantage of a conservative operative trial. Secondary nephrectomy, if necessary, is preferable to primary removal of a potentially useful kidney. The various operative techniques by which plastic repair of the ureteropelvic junction is accomplished are well known. In selection of a technique to be employed it is extremely important to remember that no single operative procedure is applicable to all cases. It is often necessary to combine two or more methods to obtain a successful functional result. The obvious clinical importance of bilateral obstructions at the ureteropelvic junction cannot be overemphasized. Most patients who have come under our care have already suffered considerable loss of renal function, and the condition has usually been complicated by infection. In the treatment of such patients the side with the greater renal damage should be operated on first and the other side operated on without unusual delay, preferably within three months. The reason for this is that once the obstruction on one side is relieved, the function of the opposite kidney fails at a more rapid rate. If it is left untreated, it will soon become a functionless hydronephrotic or pyonephrotic sac.

Congenital obstructive lesions at the ureterovesical junction fall into two categories: those involving only the mucosa and those involving all the layers of the ureteral wall. In the first group, the pressure of urine retained behind the tiny ureteral orifice causes a ballooning of the mucosa into the bladder so that the classical intravesical cyst or ureterocele is produced. Typically, when viewed cystoscopically, the cystic masses appear and disappear in response to ureteral peristaltic pressure, except when the mucosa has been thickened and fixed by chronic infection, in which case the cysts are maintained in their distended state. Roughly, the amount of associated ure-

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teral dilatation is proportional to the degree of stenosis of the orifice. Occasionally, the cyst may be of such proportions as to produce acute retention by obstruction of the vesical outlet. In women it may be extruded through the urethra. As a rule these patients, particularly adults, require simple transurethral resection of the cyst. In chil-

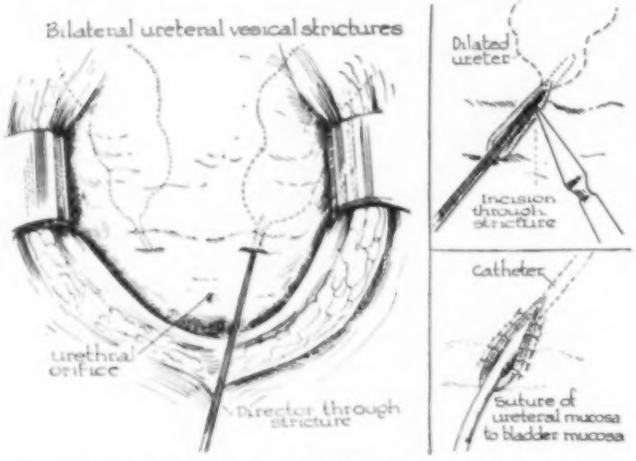

Fig. 1.—Transvesical meatotomy for bilateral ureterovesical stricture.

dren, however, because of the small caliber of their urethras and the large size of the ureterocele, suprapubic excision is frequently required.

The second group of obstructive lesions at the ureterovesical junction, those that involve the entire wall, have in our experience been encountered entirely in children. More commonly, they are bilateral and are associated with pronounced dilatation of the upper urinary tract. There are three methods by which these obstructions may be relieved. The first is by cystoscopic ureteral dilatation, which, in our hands, has been unsatisfactory. The child's urethra frequently will not accommodate instruments of sufficient caliber to make any real impression on the obstruction; general anesthesia is necessary, and dilations must be carried out too frequently to be practical. In

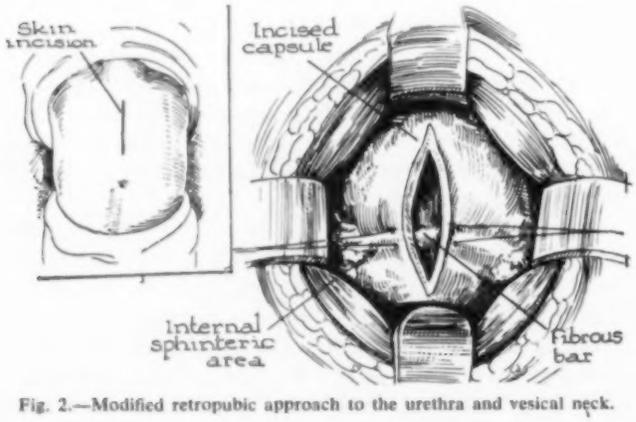

Fig. 2.—Modified retropubic approach to the urethra and vesical neck.

the second method, one should free the bladder posteriorly, expose the ureters at their entrance into the wall of the bladder, sever them at this point and reimplant them into the bladder. There are three inherent disadvantages in this procedure: (1) the ureters are dilated and do not lend themselves well to reimplantation, (2) there is a real danger of compromising the blood supply to the severed ureter and (3) the orifices so produced are functionally no better than those produced by simpler methods. Ureteral meatotomy, the third method, may be performed transurethrally if the urethra will accommodate an operating type of child's cystoscope. If there is any question as to the feasibility of this procedure, the operation should be performed suprapubically as depicted in figure 1. The stenosed orifice is incised through the entire area of stricture and the ureteral mucosa is sutured to the vesical mucosa. Ureteral catheters are left indwelling for five to seven days. This method has proved successful in our hands.

The simple fact that congenital obstructive lesions are often multiple cannot be overemphasized. Not infrequently obstruction at the vesical neck is associated with obtruction at the ureterovesical junction. Preoperative evaluation must include careful examination for residual urine as well as endoscopic examination of the vesical neck. Any obstructive tissue in this area must be removed. It is a common observation that a grossly dilated upper urinary tract in these patients rarely returns to normal after the obstruction has been removed. However, the urine can usually be rendered sterile and further

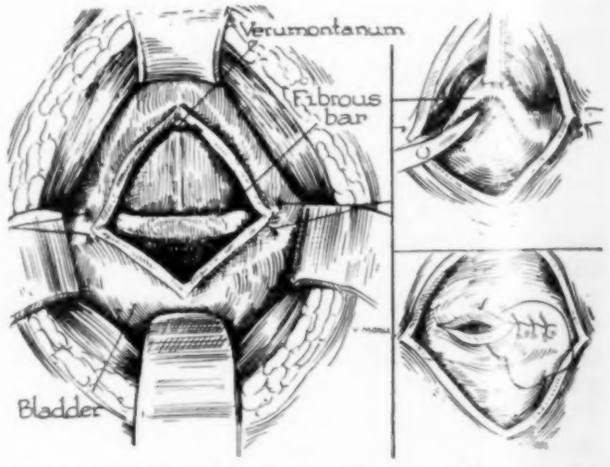

Fig. 3.—Prostatic urethra opened widely from just proximal to the verumontanum to the vesical trigone.

loss of renal function prevented, provided all obstructive lesions have been removed.

Congenital obstructions to the vesical outlet vary widely but generally fall into one of three large groups. The two commonest types are (1) elevation of the posterior internal sphincteric area simulating the median bar in adults and (2) contracture of the internal vesical orifice. These can occur in both males and females. The third and least common type is congenital prostatic urethral valves. Whatever the immediate lesion, the syndrome of uncomplicated obstruction of the vesical neck is fundamentally the same in each patient, namely, frequency, difficulty, straining and finally acute retention of urine or paradoxical incontinence. The syndrome and the physiopathology associated with it are essentially the same as those observed in men with prostatism. One of the unfortunate aspects of this condition is that frequent voidings or instances of overflow incontinence are all too often interpreted merely as poor training. This lack of understanding of the problem is all the more tragic, for apparently earlier and more rapidly progressive dilatation of the urinary tract is observed in children than in

adults. The residual urine predisposes to infection, which, when present, is persistent and increases the rapidity of destruction of renal function. Early recognition of this syndrome and prompt relief of the obstruction offer a good prognosis, but failure to diagnose the condition only leads to irreversible renal damage.

We employ two methods for removal of obstructing tissue at the vesicle neck. The first, transurethral resection, although adequate in some instances, does not provide a satisfactory solution to the problem in all cases. Owing to the inherent technical difficulties in the performance of transurethral resection in children and the frequent necessity for repeated operation because of inadequate removal of tissue, we have been reluctant to use it on any but the simplest cases.

The second method, which we have employed in an increasing number of cases, is a modified retropubic approach (figs. 2 and 3). After exposure of the vesical neck in the classic fashion, a longitudinal incision is made through the vesical neck to expose the vesicourethral junction. The incision may be carried as high in the anterior vesical wall as is necessary for adequate exposure. Similarly, it may be carried down through the anterior wall of the urethra. Such an incision at once provides a wide area for inspection. In males the entire prostatic urethra is visualized from the verumontanum to the

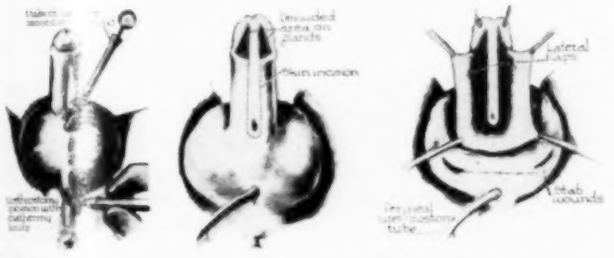

Fig. 4.—First three stages of Denis Browne technic for repair of hypospadias.

trigone. In those patients in whom obstruction is due to a bar of tissue at the posterior vesical lip the offending tissue is removed by simple excision. Enough tissue is cut away to provide a wide outlet that is soft and pliable. Similar excision of tissue is carried out if the lesion is simple contracture of the vesical neck. In each instance the cut margins of the mucosa are approximated with a few hemostatic sutures of fine atraumatic chromic catgut. Prostatic valves, which are usually simple mucosal folds, may be removed by electrocoagulation. If the upper urinary tract is not decompensated, the incision may be sutured primarily with simple sutures of fine atraumatic catgut over a small indwelling urethral catheter. If decompensation of the upper tract has already occurred, suprapubic drainage is employed over a period of months in order to permit maximum return of function.

During the past two years we have operated on 12 patients by this method. There have been no instances of postoperative incontinence, nor have there been any other postoperative complications of any importance. Postoperative infections of the urinary tract have been dealt with according to established principles. The duration of postoperative hospitalization has been eight to 12 days. Results to date have been excellent in all patients so treated.

EXSTROPHY OF THE BLADDER

Exstrophy of the bladder is an obvious lesion. The anterior wall of the bladder and overlying abdominal wall are absent; this allows the trigone and whatever remains of the posterior wall of the bladder to bulge forward and rest on the surface just above the level of the symphysis.

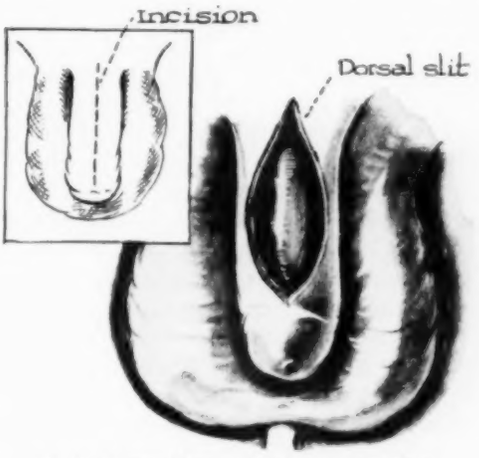

Fig. 5.—Fourth stage of Denis Browne technic.

The lower ends of the rectus muscles with their sheaths are widely separated; this leaves only the peritoneum and a thin layer of intervening fascia between the bladder and the peritoneal cavity.

Treatment of exstrophy of the bladder involves (1) transplantation of the ureters into the rectosigmoid, (2) removal of the bladder and repair of the associated ventral hernia and (3) plastic repair of the associated epispadias in males. In females, if the vagina is rudimentary, the third step is creation of an artificial vagina.

The method by which the ureterosigmoid anastomosis is carried out is a matter of individual choice. Our own preference is a minor modification of the Coffey I technique, which, in our hands, has proved simple and

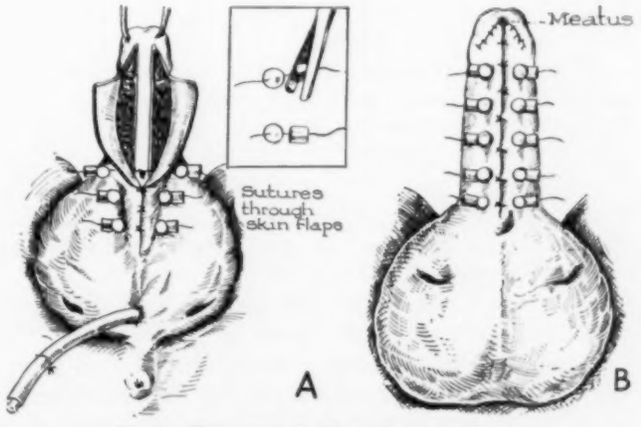

Fig. 6.—Final steps in Denis Browne technic.

as efficient as more complicated techniques. Whether the ureters are transplanted at one operation or at separate operations is again a matter of individual choice. With present day antibiotics and chemotherapeutic agents there is less reason to fear the serious septic complications that made the two stage operation a necessity a few years ago. Diversion of the urinary stream may be accomplished in patients of all ages, even in infants 6

months old. As a rule, the earlier treatment is begun, the better; for stenosis of the ureteral orifices develops in a surprising number of these patients. The ureters in such cases undergo early dilatation and lend themselves less favorably to ureterointestinal anastomosis. A few patients seen later in life will show greatly dilated and tortuous ureters. This group will require ureterocutaneous anastomosis.

Excision of the bladder and repair of the ventral hernia should be deferred until the patient has completely recovered from the operation for diversion of the urinary stream. The normal transitional epithelium of the bladder has been converted into a mucous-secreting epithelium in all exstrophic bladders. This epithelium must be removed entirely if success is to be attained in this phase. By removal of the bladder and repair of the hernia, the original defect is converted into another classic lesion, epispadias, and the patient has been prepared for the third and final operation. In females the urethra is of no importance at this stage. However, in many of the males at the time of puberty the ejaculatory ducts will be seen to open onto the surface at the penoabdominal angle with the resultant discharge of semen onto the surface. Plastic reconstruction of the penis and urethra should then be carried out to provide a coital organ. A wide variety of techniques has been employed to accomplish this third phase. We have recently employed with success a simple technique first introduced by Denis Browne (figs. 4, 5 and 6).[1]

HYPOSPADIAS

Hypospadias is a congenital defect in the urethra in which a variable portion of the urethra is absent, the ectopic meatus being situated proximal to the normally placed orifice. There is usually a ventral deformity of the penis produced by a band of fibrous tissue occupying the position of the absent corpus spongiosum. This condition may be divided into three anatomic groups: (1) glandular in which the orifice is located near the frenum, (2) penile in which the orifice is located in the shaft of the penis anywhere between the frenum and the penoscrotal angle and (3) scrotoperineal.

Glandular hypospadias is of little clinical importance unless the orifice becomes stenosed to the point of interfering with micturition, or unless the associated chordee is severe. In the first type, simple meatal dilatation or meatotomy frequently is all that is required. In the penile type the chordee is corrected, and the orifice is displaced proximally on the shaft, a penile hypospadias being thereby created.

In patients with penile and scrotoperineal hypospadias, treatment is surgical, consisting of two phases. The first, relief of the chordee, is accomplished by a transverse incision in the ventral surface of the penis and removal of all restricting bands of tissue. The incision is then closed longitudinally. Attention to detail in this simple procedure cannot be overemphasized. Inadequate performance of this step will seriously jeopardize the outcome of the entire operation.

The second phase is construction of the new urethra. Many techniques have been introduced through the years in an effort to produce as simply as possible a normally functioning urethra. In search of an ideal solution to this problem we have found that the principle embodied in the Denis Browne technique (figs. 4, 5 and 6) seems to lend itself to a simple adaptable method that provides an excellent functioning result. This procedure possesses several advantages over more complicated techniques. After the straightening operation—common to all techniques—has been performed, it is a one stage procedure. It is easily performed and may be completed before the child reaches school age. The average duration of hospitalization is 10 to 14 days, a factor of tremendous economic importance.

The technique of the Denis Browne operation employs a novel method for creating a fully epithelized, soft, pliable urethra. Parallel longitudinal incisions about 0.5 cm. on either side of the median raphe of the penis are carried from the glans to about 0.5 cm. proximal to the urethral meatus and joined in an arcuate fashion. With these incisions as starting points, full thickness skin flaps are produced by lateral dissection until they may be brought together in the midline and sutured without tension. This is accomplished by placement of interrupted silkworm gut sutures as shown in figure 6 A. The skin edges are then sutured with fine chromic catgut. The central island of epithelium, undisturbed, is thus covered completely with a full thickness of penile skin. The distal extremities of the lateral flaps are sutured to previously scarified areas on the ventral surface of the glans, while the proximal extremities of the flaps are brought together and closed to incorporate the hypospadiac meatus in the newly created channel. No catheters or foreign bodies of any kind are left indwelling in the new channel, the urinary stream having been previously diverted by means of perineal urethrostomy. A dorsal longitudinal incision is made over the entire length of the penis in order to reduce all possible tension on the ventral suture line. This incision is allowed to heal secondarily. Only the simplest of gauze dressings is applied for the first few days.

EPISPADIAS

This rare congenital anomaly is seen oftener in males. It is included here because the technique for correction of hypospadias described in the preceding paragraph is also adaptable to correction of the epispadiac deformity. The lesion may be balanotic, penile or "complete." The balanotic type may be mild and require only the simplest methods, as does its hypospadiac counterpart. Similarly, the penile type lends itself to correction by the method already described. However, in the third or "complete" type in which the sphincter is incompetent, the primary requisite is reestablishment of the competency of the sphincteric mechanism. In such cases one may attempt to reestablish the sphincteric mechanism and construct the anterior urethra simultaneously. Failing to secure a competent sphincter, one has no choice save diversion of the urinary stream, preferably to the sigmoid.

SUMMARY

Congenital obstructive lesions of the urinary tract are usually encountered at or near the ureteropelvic or ureterovesical junction and at the vesical neck. Because they are frequently multiple, thorough evaluation of the urinary tract is imperative before institution of therapy.

1. Burns, E.: The Denis Browne Operation for Hypospadias, J. Urol. 64: 382 (Aug.) 1950.

No single operative procedure is applicable to all cases of obstruction at the ureteropelvic junction. One may find it necessary to combine two or more methods in order to obtain a good functional result. If the obstruction is bilateral, the side with the greater renal damage should be operated on first and the other side within three months, if possible.

For obstruction at the ureterovesical junction involving only the mucosa, transurethral resection of the resulting intravesical cyst is usually sufficient, although in children suprapubic excision is frequently required. For obstructions involving the entire wall, which, in our experience, have been encountered only in children, ureteral meatotomy has proved successful in our hands.

Obstructions at the vesical neck must be relieved promptly before irreversible damage takes place. We prefer the modified retropubic approach for removal of these obstructions, although the transurethral approach may be employed. Exstrophy of the bladder is an obvious lesion which is treated by transplantation of the ureters into the rectosigmoid, removal of the bladder and correction of the associated hernia, and plastic repair of the penis.

Of the three types of hypospadias, glandular hypospadias, when the orifice becomes stenosed, requires simple meatal dilatation or meatotomy unless severe chordee is present, in which case it is necessary to convert it to a penile hypospadias, which is treated accordingly. For penile and scrotoperineal hypospadias, treatment consists of surgical correction of the chordee followed by construction of the new urethra. We prefer the Denis Browne technique for this purpose, because it is simple and easy to perform, is capable of completion in the preschool age and has a relatively short postoperative course. Epispadias can be corrected by this same technique.

ADVISABILITY OF SURGICAL REVERSAL OF SEX IN FEMALE PSEUDOHERMAPHRODITISM

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Most children with intersexual external genitalia can be converted into acceptable boys or into acceptable girls by appropriate surgical measures. If progressive endocrinologic abnormality is absent, such surgical change will be made to agree with the gonadal sex, unless of course it would have to be made after the attitudes and inclinations of the contrary sex had been established. These generally accepted opinions are the basis for advocacy of early operative exploration of pseudohermaphrodites, so that surgical and psychologic treatment in conformity with the true sex of the gonads can be started before the contrary psychologic pattern is set.[1]

I have no quarrel with the use of gonadal sex as the basis for treatment of male pseudohermaphrodites, although the problem of the genetic female with adenoma tubulare masquerading as a testis has yet to be solved. But the female pseudohermaphrodite, in a high proportion of cases, is the result of progressive androgenic overactivity of the adrenal gland during and after fetal life. This is the significant differentiating fact. This influence, in contrast to the genetic or developmental or maternal influences in the case of other forms of pseudohermaphroditism (table), will continue to act after the period of fetal development. Progressive masculinization after birth can, therefore, be expected in these patients. Of course, a female pseudohermaphrodite can be surgically and psychologically treated in infancy or childhood so that she will react as a female. But she will have the secondary sex characteristics of a boy. She will have a deep voice, a somewhat masculine physique, a beard and hairy body and a receding hair line. Because of these progressive changes, which at present are irreversible by surgical or hormonal means, she will be accepted neither as a male nor as a female.

For this reason of progression of masculinization, the stand that all pseudohermaphrodites be treated according to their gonadal sex must be questioned. The purpose of this paper is to prevent needless phallic sacrifice. The decision must be made from consideration of five aspects: surgical, endocrinologic, psychologic, moral and legal, each of which will be discussed in the light of past experience and present knowledge.

CLINICAL MATERIAL

I have two sources for data bearing on the problem of sex reversal in female pseudohermaphroditism due to adrenal hyperplasia: the experience of previous students and my own experience. This material has been assayed for its surgical, endocrinologic, psychologic, moral and legal values.

The records of the past concerning 149 patients reported on in the literature will be reviewed in detail in a separate communication.

Of interest is the finding that, among 53 patients reported on after they were 15 years of age, 16 were raised as males (four being changed to females just after puberty) and 37 were raised as females (two being changed from males). Five of those raised as boys later married women. There were two who committed suicide because they were prevented from marrying women, as their birth certificates stated they were female. A third of those raised as females were subjected to clitoridectomy.

I have personally observed five children. Two are being surgically altered to live as boys, and three have been operated on by others to become more anatomically feminine.

REPORT OF CASES

CASE 1.—W. K. is now 3½ years old. One sibling with similar genitalia and adrenal insufficiency, died at the age of 4 months. A second sibling, aged 15 months, is a normal girl. The present child was born with a vagina, large clitoris and labia resembling a scrotum. It was felt to be a boy and was so christened. Five days after birth he was discharged from the

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1. Melicow, M. M., and Cahill, G. F.: The Role of the Adrenal Cortex in Somatosexual Disturbances in Infants and Children: 9 Clinicopathologic Analyses, J. Clin. Endocrinol. **10**: 24-53 (Jan.) 1950. Hooks, C. A.: Clinical Aspects of Intersexuality, J. Urol. **62**: 528-534 (Oct.) 1949.

United States Naval Hospital, Oakland, Calif., and was returned 15 days later because of persistent vomiting. He was treated with salt and adrenal cortex extract, and his difficulty was cleared.

At the age of 6 weeks he was admitted to the University of California Hospital, at which time he was noted to have a large clitoris and atresia of the vaginal orifice, with the urethra entering the vagina, which was very large (fig. 1). There was a flat cervix with a patent orifice. The urethra was normal except for its point of entry, and there were folds about the meatus. No verumontanum, ejaculatory ducts or prostate could be found. The bladder was slightly trabeculated. No gonads or adrenal glands were palpated. On rectal examination a prostate could not be felt. Vaginograms were made (fig. 2 *A*). The impression was that this was a female pseudohermaphrodite with adrenal hyperplasia. The bone age was normal, and the 17-ketosteroid excretion was 4.1 mg. in 24 hours (ketonic).

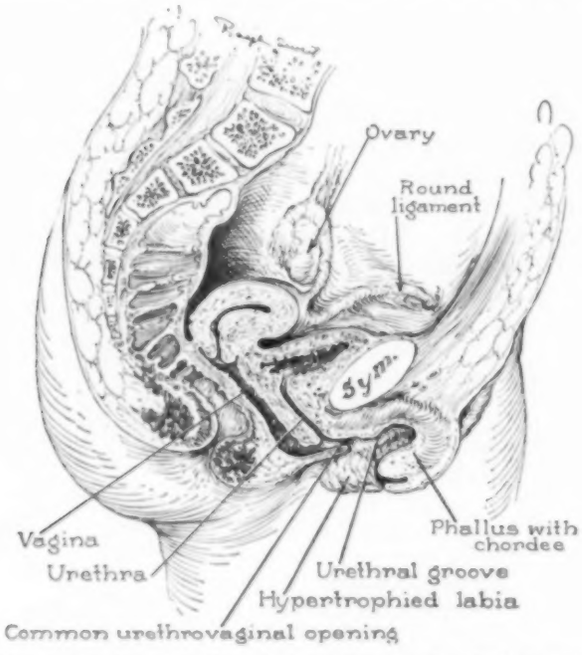

Fig. 1.—Drawing of relation of internal to external genitalia in case 1, typical of female pseudohermaphroditism due to congenital adrenal hyperplasia.

Treatment with an extract of adrenal cortex (eschatin®) alone, salt alone or desoxycorticosterone acetate alone caused persistence of the vomiting. The administration of a combination of desoxycorticosterone acetate, given sublingually, salt and sodium bicarbonate, however, was effective in controlling the adrenal insufficiency.

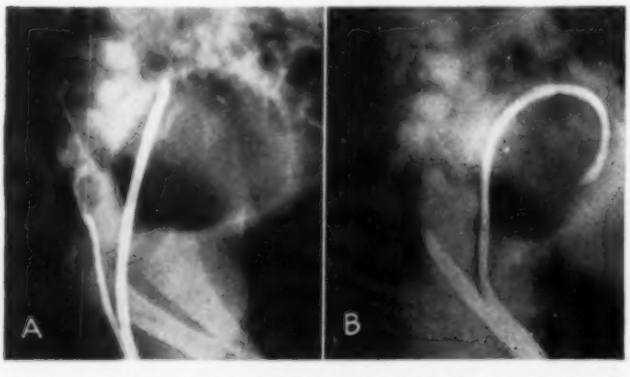

Fig. 2.—Vaginogram with air cystogram, lateral view. *A*, case 1. *B*, case 2.

At the age of 6 months a pellet of desoxycorticosterone acetate (percorten®) was implanted, and at that time the bone age measured 1 year.

The child was readmitted at the age of 1½ years for study with pituitary adrenocorticotropic hormone administration. Treatment with this compound failed to cause the normal eosinophil drop, indicating decreased 11-oxysteroids. The 17-ketosteroid excretion was 4.8 mg. per 24 hours. It was noticed that there were increased erections and masturbation. The parents were advised at this time to raise the child as a boy. A year later psychologic evaluation showed a mental age of 2 years 8 months, an intelligence quotient of 107 and a normal social quotient. His bone age was then 7 years.

The child was readmitted at the age of 3 years (fig. 3 *A*), and a first stage repair of the hypospadias, swinging the prepuce ventrad, was performed with the child under general anesthesia. During the procedure there was carpal spasm, followed by twitching and partial convulsions. A hyperventilation syndrome was considered the most likely cause, and the patient was treated accordingly. However, immediately after operation there was a severe Addisonian crisis, which was treated intensively with salt and adrenal cortex extract. After these difficulties, it was suggested that the second stage operation be performed when the child reached an age at which spinal or caudal anesthesia could be used. The bone age as measured recently (at the chronologic age of 3½ years) was 12 years. Photographs taken postoperatively (figs. 3 *B* and 4 *A*) show a very well developed phallus and masculine physique.

Tentative Classification of Intersexuality

Gonad	Characteristics	Possible * Etiologic Mechanism
Male		
A	Feminine habitus and genitalia except testes and small penis; usually raised as girls	Sex reversal from genetic female (adenoma tubulare)
B	Intersexual genitalia with other anomalies without feminization	Developmental arrest
C	Varying degrees of hypospadias	Excess or abnormal maternal (? adrenal) hormones
Female		
A	Intersexual genitalia without progressive masculinization	Genic disturbance
B	Intersexual genitalia with other anomalies without progressive masculinization	Developmental arrest
C	Intersexual genitalia with progressive masculinization	Excess androgenic function of fetal adrenal gland
Both Male and Female		
A	Intersexual internal and external genitalia without progression	Developmental arrest or genic disturbance of gonad

* The respective roles of mutation, developmental arrest and maternal hormones cannot be discussed here. However, such factors may not be mutually exclusive.

Summary.—A 3½ year old female pseudohermaphrodite had a sibling with a similar deformity. The patient's masculinization was progressive, so that at the age of 3½ years he had profuse genital hair, a large phallus, advanced bone age (12 years) and slightly elevated 17-ketosteroids. He had, in addition, moderate adrenal cortex insufficiency controlled by subcutaneous implantation of pellets of desoxycorticosterone acetate. The hypospadias was corrected surgically, with the intention of continuing to raise the child as a boy.

Case 2.—A. B. is also now 3½ years old. An older brother, genitalia not described, died at the age of 3 months of dehydration and vomiting ascribed to "pylorospasm." An older sister is normal. At birth it was noticed that the labia were swollen and that the patient had a very large clitoris, which grew rapidly after birth. The child was admitted to the University of California Hospital at the age of 3 weeks with adrenal cortex insufficiency. Treatment was with saline solution, desoxycorticosterone acetate and an extract of adrenal cortex. Panendoscopy showed that the urethra and vagina opened into a short common passage exactly similar to that in case 1. Vaginograms with air cystogram showed the relationship between the vagina and the bladder (fig. 2 *B*). 17-Ketosteroid excretion was 15.9 mg. per 24 hours (ketonic), 8 per cent of which was dehydroandrosterone. The patient was discharged with the diagnosis of adrenogenital syndrome in a female infant. During the first year of life, in Oklahoma, peritoneoscopy was done, which was not diagnostic.

Readmission occurred at the age of 2 years, at which time pellets of desoxycorticosterone acetate were implanted to combat the chronic adrenal insufficiency, oral treatment for which was begun in Oklahoma. Exploratory laparotomy (Dr. H. F. Traut) revealed bilateral cystic ovaries, normal uterus and tubes and questionably normal adrenal glands. Sections were read as showing normal infant ovarian tissue. The bone age at this time was 5 to 5½ years. The crines were well developed, and the general body form already appeared somewhat masculine (fig. 5 *A*). The child was discharged to be raised as a boy, named Allen rather than Anita.

Dr. Lawson Wilkins, in a letter at this time (Jan. 31, 1949) suggested, on the one hand, raising the child as a girl if she were older and had already been raised that way, but that in this case raising her as a boy would present fewer problems in later life. He suggested that the ovaries and uterus might later be removed. Consequently, the birth certificate was changed by affidavit without difficulty.

A first stage hypospadias repair was done at the age of 2¾ years. Considerable oozing occurred during the operation so that transfusion was necessary, but no signs of adrenal insufficiency were encountered. The child was readmitted at the age of 3¼ years for control of the adrenal insufficiency. His parents noted that he was making a much better adjustment as a boy than he had as a girl. His bone age was 12 years at this time, and the 17-ketosteroid excretion was 25.9 mg. per 24 hours. At present he is maintained on 2 to 4 drops of desoxycorticosterone in oil (cortate®) a day and has a 75 mg. pellet of desoxycorticosterone acetate implanted subcutaneously. Photographs (figs. 4 *B* and 5 *B*) show his present genital and bodily status.

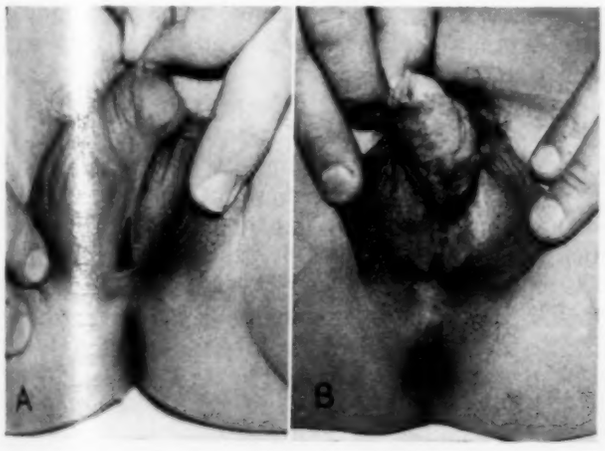

Fig. 3 (case 1).—External genitalia: *A*, preoperative, 3 years of age. *B*, postoperative, 3½ years of age.

Summary.—A female pseudohermaphrodite, with a sibling who had adrenal insufficiency, and with progressive masculinization (increased 17-ketosteroid excretion, increased bone age, gross genital hair, large phallus and masculinized physique), was subjected to a first stage repair of hypospadias in order better to raise the child as a boy.

Case 3.—S. F. C. is now 18 years old. She was first admitted to the University of California Hospital at the age of 5½ years, with the history that at birth abnormal genitalia and at 3 years abnormally rapid growth had been noted. There had been no feeding problem, however. On examination she was observed to have moderate hirsutism, a common passageway for the urethral and vaginal openings and, on rectal examination, a uterus. Her bone age at that time was 10 years. Perirenal air insufflation showed possibly enlarged adrenal glands. At this time adrenal exploration was carried out through the bilateral lumbar approach of Young. The left gland was twice normal size, and two thirds of it was removed. The right gland appeared normal, but a small adenoma was resected from its surface. Exploratory laparotomy revealed normal uterus and tubes; therefore, a plastic operation was done to remove the clitoris and expose the vagina. The child was readmitted at the age of 8½ years, even more masculinized than before. She was having considerable difficulty adjusting socially, since her voice was deep and she had acne and masculine breasts. Air insufflation was again done, which showed a right adrenal shadow the same size as before, with some calcification. X-ray therapy was given to this adrenal gland (3,127 tissue r) with questionable improvement thereafter. 17-Ketosteroids at this time were 13.9 mg. per 24 hours (ketonic). The following year ethinyl estradiol, 0.05 mg. twice a day, was given. The 17-ketosteroids were then 23.7 mg. per 24 hours (ketonic). It is noted that the only clearcut improvement was a reduction in the severity of the acne. The child was admitted at the age of 9½ for removal of the remaining third of the left adrenal gland. There was no postoperative Addisonian difficulty. The 17-ketosteroid excretion postoperatively was 10.7 mg. per 24 hours (ketonic).

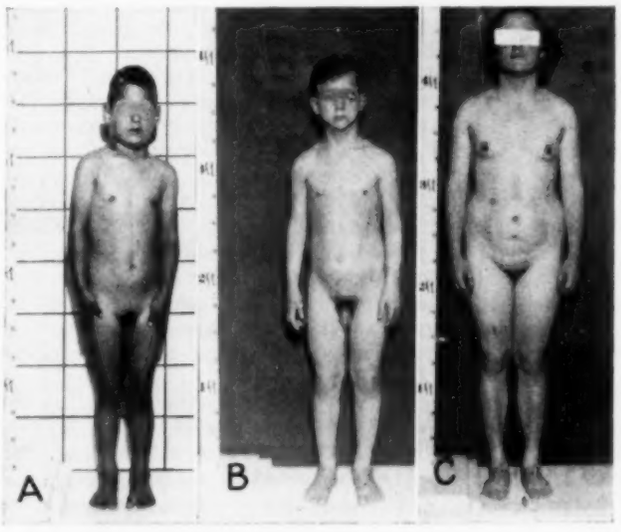

Fig. 4.—*A*, W. K. (case 1), 3½ years of age. *B*, A. B. (case 2), 3½ years of age. *C*, S. F. C. (case 3), 18 years of age.

Readmission occurred at the age of 13. In the interval she had become more female in her likes and dislikes, and it was felt that her body was more rounded. However, an increase in bodily hair and little change in the depth of her voice were noted. She was constantly harrassed by the other children, who commented on her hairiness. She was given diethylstilbestrol, 1 mg. three times a day, for a month without effect. 17-Ketosteroid excretion was now 68.7 mg. per 24 hours (ketonic). The bone age was 17 years. Further estrogen therapy caused some growth of the breasts, especially of the nipples, with pigmentation in this area, but the comment is made that there was increased hirsutism, which caused her mother great concern. At

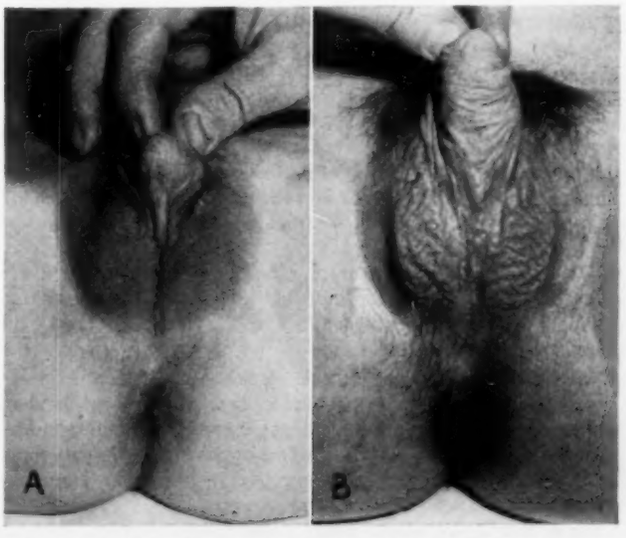

Fig. 5 (case 2)—External genitalia: *A*, preoperative, age 2 years. *B*, postoperative, age 3½ years.

the age of 18, premarin® (estrogenic substances [water soluble]) was given, 2.5 mg. twice a day in short courses, which resulted in menstrual spotting. A photograph is shown of her present state of development (fig. 4 *C*).

Summary.—An 18 year old female pseudohermaphrodite has had repeated partial adrenalectomy and hormone therapy, as well as clitoridectomy, without arrest of the progressive masculinization.

CASE 4.[2]—D. G. Y. is now 11 years of age. She was felt to be a girl at birth and has a sister two years younger, also with pseudohermaphroditism (case 5). D. G. Y. was admitted to the University of California Hospital at the age of 3½, having had pyelitis every three to four months for the previous year. At first, soon after birth, she had been a feeding problem and had vomited, but this had not recurred. At the age of 1½ years she had a circumcision of the clitoris because cysts had been noted beneath the prepuce. On admission a large clitoris was noted, with a single opening beneath it. The labia minora were adherent to the clitoris. Study showed a normal bladder and urethra, except that the urethra emptied into the anterior wall of the vagina, forming a urogenital sinus. The uterus and cervix were present and felt normal. The pyelitis was cleared, and the patient was discharged.

Two months later the patient was readmitted, and an exploratory laparotomy was performed (Dr. H. F. Traut). This revealed normal uterus, tubes and ovaries with follicles. The clitoris was amputated. At the age of 4 years the bone age was noted to be 8.3 years. 17-Ketosteroid excretion, measured at the age of 5 years, was 12 mg. per 24 hours (ketonic). The clitoris at this time had regrown.

Since that time the child has continued to be masculinized. Two more clitoral amputations have been necessary because of regrowth of the phallic stump. Recently the mother has had difficulty curbing her children's questions and anxiety concerning their unusual bodily state, and so far she has refused to have them photographed again.

CASE 5.—D. K. Y. is 8 years old at present. She, as was her sister (case 4), was called a female at birth. She was admitted to the University of California Hospital at 3 months of age. She had a clitoris 2.5 cm. long with scrotal folds for labia, a urethral groove and a single urogenital sinus. With the child under anesthesia, the ovaries were questionably palpable but the uterus was felt to be present. A common urogenital sinus and a large uterus were seen on hysterogram. She was readmitted one month later for exploratory laparotomy (Dr. H. F. Traut). As in her sister, normal ovaries with follicles were found and the clitoris was amputated. Later, revision of the vagina was suggested. At the age of 7 months there was pubic hair, and the bone age at 21 months was 27 months. The 17-ketosteroid excretion was 9.9 mg. (ketonic), which rose three months later to 16.1 mg. per 24 hours, and it was noted at this time (age 2 years) that the clitoris had regrown.

Like her sister, this patient physically has been progressively masculinized, although her interests and inclinations continue to match her environmental sex. She will continue to be brought up as a female.

Summary.—These two female pseudohermaphrodites have become progressively masculinized, but, since ovaries were found at laparotomy, they have been subjected to clitoridectomy and raised as girls. Their excessive physical masculinization at present (aged 11 and 8 years, respectively) may make one question the advantages gained by this course.

These five cases allow some comparison between patients with the congenital adrenogenital syndrome raised as boys and those raised as girls. Examination of the photographs shows that surgical treatment is more effective if it can go along with the patient's hormonal development (hypospadias repair in cases 1 and 2) rather than against it (clitoridectomy in cases 3, 4 and 5). It is, of course, impossible to estimate the ease of adjustment of the boys when they reach the critical age of puberty, but they have adjusted very readily so far. The girls, however, have actually been observed to adjust poorly with their classmates.

COMMENT

It seems obvious that one cannot decide at birth (1) that the deformity is due to adrenal overactivity or (2) that if it is it will be progressive. 17-Ketosteroid determinations do not become sufficiently elevated for months; bone age is normal, and secondary sex characteristics are still dormant—these being the criteria to be used in assessing progression. However, by the age of 2 years, these three signs will be manifest if progressive adrenogenital masculinization is to occur. If doubt exists (I felt the presumptive evidence so strong in one of the cases, case 2, that abdominal exploration was not performed), laparotomy is done to ascertain the presence of ovaries and hyperplastic adrenal glands. And it is at this age—before irreversible social and psychic changes have taken place—that the decision as to sex must be made, to be determined on surgical, endocrinologic, psychologic, moral and legal grounds.

Surgical Aspects.—The anatomic condition in these patients is illustrated in figure 1. The phallus, although even larger than that of a boy of similar age, is held down in ventral chordee. If the patient is to be made a boy, this chordee is released in an exactly similar manner to that employed for perineal hypospadias. There is only one previous report of use of this procedure for treatment of female pseudohermaphroditism[4]; I used such a technique in two of my patients (cases 1 and 2). The urogenital sinus, into which both vagina and urethra open, is utilized as a continuation of the urethra, allowing the use of a modified Wehrbein operation to bring this passage to the end of the phallus. The result should be indistinguishable from that after repair of extreme degrees of hypospadias. The presence of the vagina is not of consequence, as has been shown by Cecil[4] in cases of extreme hypospadias. Progressive masculinizing influences will maintain the phallus proportionate to the development of the body, so that at puberty the boy will have a serviceable penis.

On the other hand, if it is desired to reverse the hormonal trend and raise the child as a girl, clitoridectomy (perhaps repeated) is done, followed by a plastic operation to expose the vagina at its point of juncture with the urogenital sinus, as described by Young.[3]

In either case present surgical technique allows construction of functional external genitalia suitable for the chosen sex.

Endocrinologic Aspects.—With the congenital adrenogenital syndrome two facts must be faced: that there will usually be progressive masculinization, and that this trend cannot be reversed by surgical means.

Of course, female infants with milder degrees of pseudohermaphroditism in whom progression of masculinization does not occur will be passed over by parents and by authors, so that the literature and individual clinical experience will be weighted in favor of progression. But most patients observed after the age of 2 years who

2. This case and case 5 are being reported in more detail by R. C. Bentinck and others.

3. Young, H. H.: Genital Abnormalities, Hermaphroditism and Related Adrenal Diseases, Baltimore, Williams & Wilkins Company, 1937.

4. Cecil, A. B.: Surgical Management of Vagina in Male Construction in Hermaphrodites, J. Urol. **62**: 709-712, 1949.

show evidence of excess androgen secretion at that time (advanced bone age, increasingly large phallus, hirsutism and high 17-ketosteroid excretion) will show progression throughout prepuberal life.

Partial adrenal resection, while perhaps logical in theory, has been disappointing as a therapeutic measure in the 12 reported cases. Most of the patients were operated on after puberty, however. As Young [3] suggested, better results might be expected if excision were carried out before that time. Also, apparently inadequate amounts of tissue were removed, since on the one hand no cases of postoperative adrenal insufficiency have been reported among these 12 patients and, on the other, seldom significant, and never permanent, lowering of 17-ketosteroid excretion was obtained. The combination of subtotal excision with judiciously metered roentgen radiation after operation has yet to be fully exploited, although in case 3 it was not particularly effective. Interpretation of results of partial adrenalectomy must be tempered by the realization that patients who subject themselves to the procedure often have a very strong desire to become more feminine and will interpret minor postoperative improvement accordingly. The fact that a decrease of 17-ketosteroid excretion to levels even approaching normal has not occurred makes one hesitant about accepting reports of improvement, especially since the patients have usually been followed only a short time.

Hormonal therapy, especially the administration of estrogens, has been, of course, tried by many in an attempt to neutralize the excess androgens or to bring out feminine secondary sex characteristics. The usual effect is increased size of the breasts, especially of the nipples, which become protuberant and pigmented. One of the present patients (case 3) had a better mammary response than that illustrated in published works. In some cases there is decreased hirsutism or higher-pitched voice, but these changes are open to the same criticism as are those from partial adrenalectomy. Occasionally, hirsutism increases. The case of the child to whom diethylstilbestrol was given at the age of 5 well illustrates the dangers of early administration, for the epiphyses closed even more rapidly than is usual in these cases.

So far, attempts have been made to use estrogens directly or indirectly to antagonize the androgens. The expected feminization has not been forthcoming. A more rational experimental approach is the attempt to inhibit the adrenal cortex cells themselves, and so decrease the excess excretion of androgens. It has been suggested [5] that desoxycorticosterone might have this effect, and compound E, through its "S" hormone action of antagonism to the androgenic "N" hormones, has been proposed.[6] The use of cortisone in a 15 year old female pseudohermaphrodite has recently been reported by Wilkins.[7] He obtained notable reduction in 17-ketosteroid excretion during the 15 day period of administration, but the level rose again 11 days after cessation of treatment. A personal communication from Wilkins indicates that administration of 25 mg. of cortisone daily to these patients will cause feminization and menstruation. Whether this compound is safe enough to give over long periods has yet to be shown, but it may be most useful in those female pseudohermaphrodites who have been raised as or altered to be girls. Whether it should be administered to children with strong masculine social and psychologic trends might be questioned.[7a]

Psychologic Aspects.—Modern, in contrast to nineteenth century, psychiatric thought ascribes to the hormones the quantity of sexual drive but reserves for psychologic and environmental forces the direction of that drive.[8] It is the psyche that chooses the sex object,[9] although biologic factors play a minor role [10] by marshaling the psyche to follow the somatic characteristics. It was apparent from perusal of the reported cases that 30 per cent of the patients were raised as males without reported conflict; and, perhaps more important, only one was reversed once he had reached puberty. Thus, masculinity was usually not so burdensome that later reversal was desirable or necessary.

Similarly, Ellis,[8] in his attempt to find the basis for sexual choice in homosexual persons, studied the sex objects of true hermaphrodites and pseudohermaphrodites. Significantly, female pseudohermaphrodites with adrenal hyperplasia, if raised as males, were all heterosexual (chose women as sex objects), whereas if raised as females they occasionally were bisexual (chose both men and women for sex objects). This adds to the evidence for raising these persons as males.

In summary, present psychologic data indicate that a person seen early enough (before the age of 2 or 3 years) will fit best in the sex in which he has been arbitrarily raised.

Moral Aspects.—The attitude of society toward intersexuality has gone through two great phases. In ancient times, incest was the most universally repugnant moral crime and perversion was even condoned. In more modern times, on the other hand, perversion has become increasingly immoral and incest, while certainly not condoned, is looked on with slightly less abhorrence.

Ancient Jewish codes formulated religious rules for intersexes that were not particularly discriminatory. For example, in the Talmud (Tract Sabbath, Chapter 19, Mishna 3) the exception is made for the hermaphrodite that the Sabbath must not be desecrated by his precircumcisional or postcircumcisional bath. Also, the laws of uncleanliness did not apply to him.

In early Roman times hermaphrodites were regarded as omens of bad luck, but later there was a reversal of attitude and they were even allowed to marry.

Contemporary religious thought apparently is at two poles, with some representatives of the Roman Catholic Church on the side opposite those of most other churches. One of the Society of Jesus would formulate the Church's position with regard to the reversal of sex of the female pseudohermaphrodite as follows: 1. The actual or genetic sex is never changed. Notwithstanding

5. Gordan, G. S.: Personal communication to the author.
6. Prince, C.: Personal communication to the author.
7. Wilkins, L.; Lewis, R. A.; Klein, R., and Rosenberg, E.: The Suppression of Androgen Secretion by Cortisone in a Case of Congenital Adrenal Hyperplasia: Preliminary Report, Bull. Johns Hopkins Hosp. **86**: 249-252 (April) 1950.
7a. Since this manuscript was submitted, three patients (cases 3, 4 and 5) have received cortisone therapy without significant benefit. In case 3 mild Cushing's syndrome developed, necessitating withdrawal of the drug.
8. Ellis, A.: The Sexual Psychology of Human Hermaphrodites, Psychosom. Med. **7**: 108-125 (March) 1945.
9. Perloff, W. H.: Role of the Hormones in Human Sexuality, Psychosom. Med. **11**: 133-139 (May-June) 1949.
10. Bayer, L. M.: Pseudo-Hermaphrodism: A Psychosomatic Case Study, Psychosom. Med. **9**: 246-255 (July) 1947.

her education as a male, etc., she could never be "converted" into a male. 2. There is an essential difference in the education of a male and that of a female. 3. Male education tends directly to make a person sexually attracted to females. 4. It is morally objectionable to raise a female to be sexually attracted to females. Such an education results directly in homosexual tendencies. The conclusion is that it is morally objectionable to raise a female pseudohermaphrodite as a male.

Representatives of the Episcopal Church, on the other hand, feel that there does not appear to be any religious factor involved, other than the requirement that the person be given the fullest opportunity for spiritual integrity and development. The ethical problem is closely parallel, in that any decision in regard to an individual case should be indicated by the possibilities for the fullest and more normal opportunities for development.

The practical application of this knowledge is illustrated by two cases. De Crecchio [11] in 1865 described a female pseudohermaphrodite with hyperplastic adrenal glands, by occupation a valet, who was christened as a female but was raised as a boy. When refused the sacrament of marriage with the young girl of his choice, he is reported to have died some 20 years later of dissipation. Quinby [12] and Young [3] described a similar patient, who at the age of 31, having been forbidden to marry by a priest, committed suicide by taking mercury bichloride. One would be well advised to avoid sex reversal in members of certain religious groups.

Legal Aspects.—The law has tended in general to follow the moral and religious attitudes of the period.

In ancient times the hermaphrodite was left fairly free to choose his sex, although special legislation occasionally was formulated.

Old English law [13] demanded that the hermaphrodite decide the sex he will adopt, with the penalty of death imposed if he should change. This concept has been carried down to the present with little alteration. Prussian law of the eighteenth and ninteenth centuries removed the decision from the individual person and gave it to the parents. Medical opinion was advisory only, since the doctor was little better equipped to determine the sex than the layman. However, in modern times the informed physician, through the medium of the birth certificate, is required to determine the sex in which the person is to be reared. Since it is the doctor who signs that certificate, he is free to alter it if later he accumulates contrary evidence.

There is apparently nothing in legal precedent that makes the gonads the prime sex determinant, although usually such is the case. Lawyers are of the opinion, although they will not be bound by it, that, with the advance of medical science, sex should be based on more than the presence of male or female gonads. Physical factors, as well as hormonal and environmental influences, play an important role.

For his own protection, the physician should of course have written permission from both parents and be assured of their full understanding and consent. Also, he should have the birth certificate changed, which is done in most states by mere submission of forms.

Since inheritance and property laws no longer discriminate so sharply between male and female, the only real legal difficulty a sexually reversed pseudohermaphrodite will meet comes at the time of his marriage. To marry without informing his spouse of his sterility would be grounds for annulment. The necessity of informing her of his gonadal incongruity does not seem absolute, although the legality of withholding this information has not been tested.

In addition, if a pseudohermaphrodite breaks the law through sexual activity or perversion, it will be as a female acting aggressively as a male rather than as a male submitting in the role of a female. Broster [14] writes that in England a male may not masquerade as a female but a female may act as a male.

In summary, the law would allow sex determination by a summation of gonadal, hormonal and environmental factors. Once established as of one sex or the other, the person is no longer free to return to the opposite sex without appropriate legal action.

SUMMARY AND CONCLUSIONS

Female pseudohermaphroditism from adrenal hyperplasia is usually a progressive masculinizing disorder, as in the five cases presented.

At the age of approximately 2 years, four criteria will allow determination of the degree and direction of the progression: (*a*) advanced bone age, (*b*) increasing size of phallus, (*c*) hirsutism and (*d*) elevated 17-ketosteroid excretion.

If progression is evident, consideration must be given to the preferability of raising the child as either a masculinized female or a sterile male with ovaries. Even though it seems preferable to raise the child as a female, the surgeon is strongly urged to defer clitoridectomy until puberty to be certain that the factors favoring ultimate feminization will still be present. Five illustrative cases are presented.

Partial adrenalectomy and estrogen therapy have not been particularly useful in inhibiting masculinization or in effecting feminization. Cortisone is promising as an agent to suppress excessive androgen production and to allow feminization. It may be of use in children treated before masculine social and psychologic attitudes are established and could be especially useful in children already raised as females.

Female pseudohermaphrodites will usually fit psychically into the sex in which they are arbitrarily raised.

Except for the attitude of the Roman Catholic Church, there appears to be no moral objection to raising these persons in either sex.

If due provision is made for obtaining written permission from the parents and for changing the birth certificate, there appears to be no legal obstacle to the choice of either sex.

11. de Crecchio, L.: Ein Fall von Hermaphroditismus, Wien. med. Presse **30**: 763, 1866, cited by Bulloch, W., and Sequeira, J. H.: On Relation of Suprarenal Capsules to Sexual Organs, Tr. Path. Soc. London **56**: 189-208, 1905; Sopra un caso di apparenze virili in una donna, Morgagni **7**: 151-183, 1865, cited by Apert, E.: Bull. Soc. pédiat. Paris **12**: 313, 1910.

12. Quinby, W. C.: A Case of Pseudo-Hermaphrodism, Bull. Johns Hopkins Hosp. **27**: 50-53 (Feb.) 1916.

13. Johnson, T.: The Works of That Famous Chirurgeon Ambrose Parey, London, J. Clark, 1678, p. 590.

14. Broster, L. R.: The Adrenals in Sex, Practitioner **158**: 307-314 (April) 1947.

Consequently, if an intersexual child shows progressive masculinization, clitoridectomy should be deferred until thorough trial of cortisone is made. In children seen after masculine social and psychologic trends are established, repair of hypospadias so that the development may proceed as in a boy may be the better choice; this was done in two personal cases.

ABSTRACT OF DISCUSSION

ON PAPERS BY DRS. BURNS AND HINMAN

DR. FRANK HINMAN, San Francisco: I would like to discuss the cases of exstrophy. As Dr. Burns said, we are now transplanting ureters at a much earlier period in children, and these are developmental anomalies, entirely different from the cases discussed in the second paper, which are endocrinological. These persons with exstrophy are definitely either male or female. They have normal functioning testes, or they have normal functioning ovaries. Repair of the hypospadias has ordinarily been done, with removal of the bladder, when these children are young, and a urethra is built with the idea that they may have seminal competence. A good urethra can be built, but this urethra does not function until these male children reach puberty. As a rule, it closes up. A definite atresia of the urethra occurs, so that when the person has an ejaculation there is no way for the ejaculate to get to the outside. It is completely occluded. And so with the girls; often they have an anomaly involving the vaginal outlet but the upper vagina and urterus are perfectly normal. They have a good normal uterus, and they have normal ovaries. We have had as patients two or three of these girls who grew to womanhood and married: One of them has had two children by cesarean section; one other has had a child. So far as their sex life is concerned, it should be respected as it is in the boy. My plea would be that, in the young boys, remove the bladder by cystectomy, but do not repair the hypospadias until they reach puberty. After they reach puberty and you build a urethra, there will be some opportunity for this urethra to be kept open so that they will have a seminal tract, and when they marry they can have a family and lead a normal sex life. A boy had his ureters transplanted when he was 6 years old; when he grew older, he was unable to have an ejaculation. He finally married and was in considerable misery. We attempted again to build a urethra, but it was too late and we were unsuccessful. The only thing we could do was to tie his vas in some hope that it might relieve him. In another case a girl had her ureters transplanted when she was about 6 years old. Later when she married, she was unable to have intercourse. We did not see her until she was 19 years of age. When she had started to menstruate, she had had apparently a hematocolpos, and her doctor, thinking she could not have children anyway, did a hysterectomy. It would have been a simple thing then to have built a vagina for this girl, as was done later. There was no reason that she could not have had children. This paper of Frank Hinman Jr. brings up food for thought. This, of course, is a special type of case—adrenal hyperplasia. There are conditions that result in masculinization in the female, such as adrenoblastoma of the ovaries, some disturbances of the pituitary and adenoma of the adrenal gland. We know that when there is adenoma of the adrenal gland, with disturbance of function we can remove the tumor and cure the patient, but here we have a progressive adrenal hyperplasia. When a person is born, he gets an X or Y chromosome from the parents. The male has the X-Y chromosome, and the female has the XX chromosome, so the male may have the X-Y and the female the XX. That is a genetic factor. Dr. Hinman has shown definitely that, even though children at 2 years of age are genetically females, they will have a congenital excess of androgenic activity from a hyperfunctioning adrenal gland, and they will continue to have this androgen stimulation all their lives. I think he makes a good point, that they should be considered with respect to what their best future happiness will be, and probably a great many of them will be much happier if raised as males than if raised as females, even though they are genetically females.

DR. JAY J. CRANE, Los Angeles: Dr. Burns has emphasized the frequency with which we see patients, usually very young children, suffering with congenitally enlarged, dilated, elongated and kinked ureters, associated with renal insufficiency and chronic pyelonephritis. The fact that the condition is usually bilateral speaks for its congenital origin. The term congenital neuromuscular dysfunction amply describes the pathological state of the ureters but does not portray the clinical aspects of the disease, which is so difficult to treat and so often fatal. By the time the urologist has had the opportunity to study these young patients, the pathological picture is often so far advanced that it is difficult, if not impossible, to establish the true causation with any degree of certainty; however, in the true cases of congenital megaloureters or neuromuscular dysfunction of the ureter, there are often associated neurological findings in the gastrointestinal tract. Therefore, I believe that a complete gastrointestinal study in these young persons will be of great benefit in establishing the true diagnosis and will assist greatly in prognosticating their recovery. I agree with Dr. Hinman that we should make haste slowly in deciding what sex female pseudohermaphrodites will turn out to be eventually. The information and advice given to the parents early are of paramount importance. Dr. Hinman has made an excellent presentation. I believe that any physician before treating these unfortunate persons should ponder a long time before doing anything more radical than an abdominal exploratory operation. Certainly, before the clitoris is amputated, the patient should have the benefit of a very thorough endocrinological study.

DR. EDGAR BURNS, New Orleans: In regard to the management of patients with exstrophy of the bladder, it is important to give careful attention to the competency of the rectal sphincter. As a rule, the rectal sphincter in these patients is competent, but we have had two cases in which there was inadequate control after the ureters were transplanted into the rectosigmoid, and a plastic procedure had to be done on the rectum. This, of course, should be known before the ureters are transferred to the intestinal tract. We have resected the elongated, tortuous ureters in two cases. We believe, however, that this should be deferred until after all obstruction has been removed, because in these cases the ureters have a tendency to contract downward. In so contracting, they shorten, and it is not necessary in a great many cases to resect portions of the ureters themselves. In a few cases there will be adhesions between the loops of tortuous ureters, and, of course, when that occurs the kinks will remain and drainage from the kidneys may be inadequate. I would hesitate very much to do a nephrostomy because the kidneys in these cases have already been damaged and in the process of inserting a nephrostomy tube through the cortex, further damage to already impaired renal tissue will necessarily occur.

Airborne Infection.—The importance of air as a mode of spread of naturally occurring disease has been a long disputed question. Prior to 1890, it was a general belief, both among scientifically informed persons and the general public, that the air was the dominant mode of spread of infection. This is indicated by the general terms "miasma" meaning noxious vapors and "malaria" meaning bad air. With the advent of bacteriology, however, this belief rapidly disappeared. Although bacteria were found in air by Pasteur, these turned out to be mostly harmless saprophytes. Thorough studies of bacteria in the air were conducted by Fluegge and others in Europe and by Chapin and Winslow and others in this country. It was shown that whole rooms, or even buildings, could be readily contaminated by a spray of such harmless organisms as B. prodigiosus, but the weight of the evidence suggested that most pathogenic bacteria either rapidly died or lost their virulence when exposed to air. The attitude of most informed workers in the field swung strongly away from the concept of airborne infection toward the importance of contact and droplets. This attitude has remained the dominant concept up to the present time. Alexander D. Langmuir, M.D., The Potentialities of Biological Warfare Against Man, *Public Health Reports,* March 30, 1951.

FRACTURES OF THE HUMERUS

Carl Davis Jr., M.D., Chicago

The purpose of this paper is to present some of the problems and treatment of fractures of the humerus which frequently confront the general practitioner, physician and surgeon in everyday life. Nobody should fail to evaluate carefully, by physical and roentgenologic examination, the location and extent of the fracture, as well as the degree of injury to the soft tissues. Shock when present is treated with adequate supportive measures. Pain is relieved with appropriate medication. The treatment of fractures of the arm is dependent not only on the type of fracture but on other considerations such as age, general physical makeup and the economic situation of the patient. The knowledge of simple principles of nonoperative treatment will result in early and complete reduction in most instances. In the event of operative intervention, a competent surgical consultant must be called. The subjects in this report include

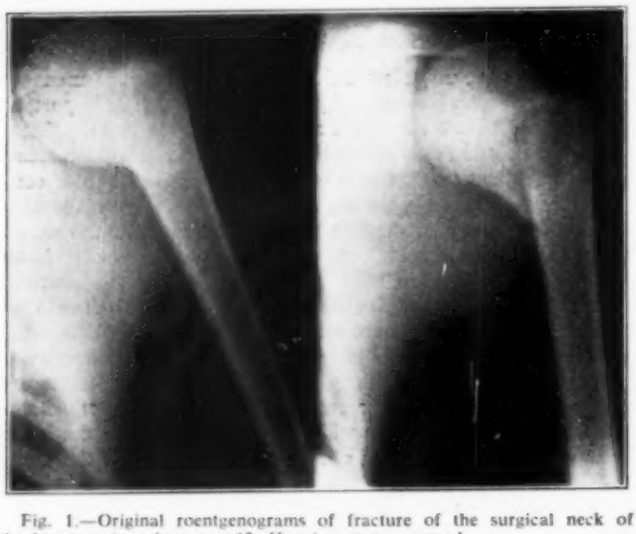

Fig. 1.—Original roentgenograms of fracture of the surgical neck of the humerus in a boy, age 12. Hanging cast was used.

fractures of the upper arm and the midhumerus and injuries about the elbow that involve the lower end of the humerus.

FRACTURE OF THE SURGICAL NECK

One of the common injuries of the upper arm in young children and adults is a fracture of the surgical neck of the humerus. In most instances the patient falls on the outstretched hand. The arm is forced into abduction or adduction, and a corresponding fracture is the result. The adduction fracture is commonest in children (figs. 1 through 3). Occasionally there is impaction of the fragments which makes the treatment simple, but in many cases the short upper fragment is abducted and externally rotated by the supraspinatus muscle, and the long distal one is pulled inward by the action of the strong pectoralis major, teres major and latissimus dorsi muscles and displaced upward by the coracobrachialis and long head of the triceps muscles.

In the management of these cases two courses may be followed. If there is impaction of the fragments, a small pad is placed in the axilla, and the shoulder and

Fig. 2.—Patient was first seen 10 days after injury. Manipulation with the patient under anesthesia and traction with the arm supported in a Thomas splint failed to give satisfactory reduction.

arm are immobilized by a shoulder cap plaster splint which extends posteriorly down to the hand with the forearm flexed at a right angle. The upper arm is then

Fig. 3.—Operative intervention resulted in good reduction. Nine months postoperatively there was union of the fracture with good function of the shoulder and arm.

fixed to the chest by a gauze dressing or elastic bandage while the forearm is held by a sling. This position is maintained four to six weeks. After this time, the splint having been removed, the arm is carried in a sling; active motion is encouraged, and physiotherapy started.

If there is displacement and overriding of the fragments, the fracture is manipulated with the patient under

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general anesthesia. The arm is then held in abduction at the required angle, as demonstrated by the roentgenogram, and immobilized in traction in a Thomas arm splint (fig. 4) until the roentgenograms indicate enough callus to free the arm safely from its traction support. An additional period of immobilization with a shoulder spica is carried out with the arm abducted 45 to 60 degrees. Some believe that a sling may be adequate instead of shoulder spica. However, it is my belief that in children the shoulder spica is used to advantage. This treatment has given a high percentage of good results. Caldwell and Smith [1] have recommended the insertion of a small Steinmann pin through the olecranon (the elbow is flexed at 90 degrees) in the treatment of unimpacted fractures of the surgical neck of the humerus where the reduction by manipulation is unsuccessful. The value of early active motion of the shoulder and elbow after union has developed is well recognized in the treatment of these cases.

The "hanging cast" was first suggested by J. A. Caldwell [2] for treatment of fractures of the shaft of the humerus. The hanging plaster cast is applied from the midarm to the wrist with the elbow flexed to a right angle and the forearm in midposition. A bandage sus-

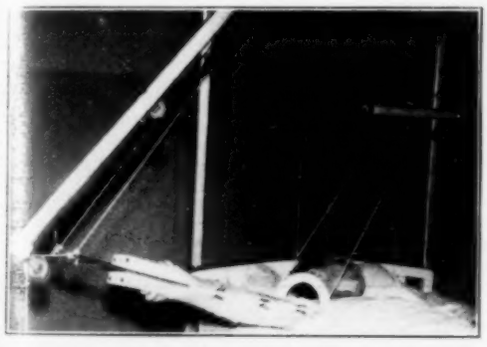

Fig. 4.—Photograph demonstrates the traction setup used frequently in the treatment of fractures of the humerus.

pends the hanging cast from the neck and is inserted through a wire ring imbedded in the plaster immediately over the radial styloid. Speed,[3] LaFerté and Rosenbaum [4] and others have recommended this form of treatment in fractures of the shaft and upper third of the humerus, including the surgical neck. Treatment with the hanging cast does not immobilize the fracture site, but it is a means of applying continuous traction to the arm. In my experience this method has not worked satisfactorily in children (fig. 5) with fractures of the surgical neck, or in some adults who are uncooperative and seem to fail to understand the objective. The hanging cast technic undoubtedly has a place in the treatment of many fractures of the humerus, but it has been utilized in selected cases only and should not be recommended for general use as the method of reduction and immobilization.

FRACTURE OF THE GREATER TUBEROSITY

Fractures of the greater tuberosity of the humerus are the result of a direct blow, due either to a fall on the shoulder or to avulsion of the tuberosity associated with dislocation of the humerus (fig. 6). Occasionally it is pulled loose by severe muscle pull. Watson-Jones claims that in nearly 30 per cent of dislocations of the shoulder there is a fracture of the greater tuberosity of the humerus. The patient is usually unable to rotate the arm outward. If there is no displacement of the fragment, the arm may be immobilized in a sling with a pad in the axilla; however, if the fragment is avulsed and the supraspinatus muscle becomes inactive because of its insertion into the bone, there is disability of the arm due to partial loss of abduction and external rotation. When a fracture of the greater tuberosity is associated with dislocation of the shoulder, the humerus should first be reduced with the patient under general anesthesia. Often the tuberosity

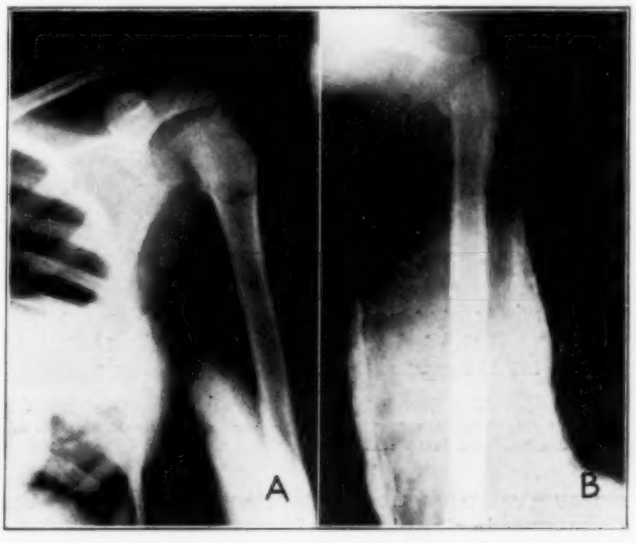

Fig. 5.—*A*, transverse fracture of the upper end of the humerus in a child, age 7. Patient was treated with a hanging cast. *B*, angulation of fracture of upper end of the humerus as result of improper immobilization and support.

Fig. 6.—*A*, subcoracoid dislocation of the humerus with fracture of the greater tuberosity. *B*, roentgenogram showing shoulder joint after manipulation, with reduction of dislocation of the humerus and fracture of the greater tuberosity (Courtesy of Dr. J. H. Olwin).

will line up without further manipulation. Simple fracture of the tuberosity should be treated by attempted reduction. The arm is held in abduction and external

1. Caldwell, J. A., and Smith, J.: Treatment of Impacted Fractures of the Surgical Neck of the Humerus, Am. J. Surg. **31**: 141, 1936.
2. Caldwell, J. A.: Treatment of Fractures of the Shaft of the Humerus by Hanging Cast, Surg., Gynec. & Obst. **70**: 421, 1940. Caldwell, J. A.: Treatment of Fractures in the Cincinnati General Hospital, Ann. Surg. **97**: 161, 1933.
3. Speed, K.: A Text-Book of Fractures and Dislocations, ed. 5, Philadelphia, Lea & Febiger, 1950.
4. LaFerté, A. D., and Rosenbaum, M. G.: The "Hanging Cast" in the Treatment of Fractures of the Humerus, Surg., Gynec. & Obst. **65**: 231, 1937.

rotation by means of a plaster shoulder spica. However, operative intervention may be necessary in some cases to obtain satisfactory reduction.

EPIPHYSEAL SEPARATION (UPPER END)

In children and young adults, separation of the upper epiphysis is occasionally seen (fig. 7). The mechanism of production is similar to that for fracture through

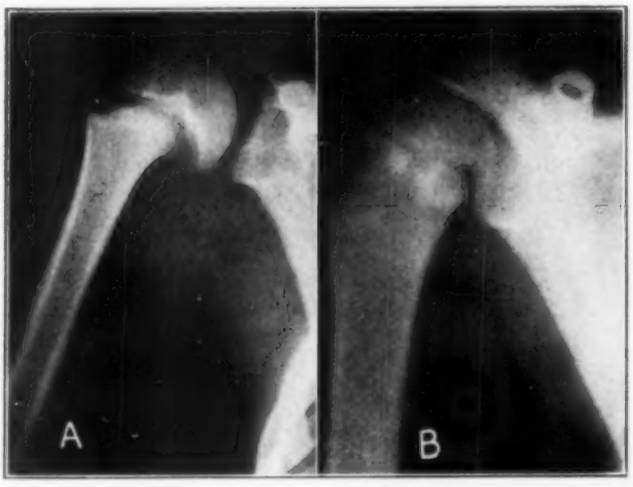

Fig. 7.—*A*, roentgenogram illustrating separation of the epiphysis of the upper end of the humerus. *B*, reduction after gentle manipulation and immobilization for a few weeks.

the surgical neck. It is important to remember that accurate reduction is desired in an effort to avoid any disturbance in growth of the humerus. The treatment consists of gentle manipulation with the patient under

Fig. 8.—Roentgenogram of the upper end of the humerus showing fracture through a rarefied area in the bone. Patient was unaware of a bone cyst in the upper end of the humerus prior to injury.

anesthesia, with maintenance of the reduction in a Thomas splint for a few weeks. This may be followed by the application of a plaster torso cast with the arm abducted to 45 degrees for a time. In some cases, however, immobilization of the arm in a sling is adequate.

5. Miller, E. M., and Fell, E. H.: Fractures of the Upper Arm, in Christopher, F.: Surgery, ed. 5, Philadelphia, W. B. Saunders Company, 1949.

FRACTURES OF THE SHAFT

Fractures of the shaft of the humerus are challenging to the physician because of the many problems which they present. The injuries of the shaft are often readily diagnosed because of the apparent deformity and loss of function. Miller has emphasized the importance of recognizing concomitant injury of the large vessels and nerves, especially the radial nerve. One should note in writing the "presence or absence of wrist drop, for, if this is first observed after reduction has been made, an embarrassing controversy may arise as to the cause of its production." [5] During delivery, particularly in breech or vertex presentations, the middle portion of the shaft is occasionally fractured. The proximal fragment is usually drawn outward by the pull of the deltoid muscle. Occasionally radial nerve palsy develops. The

Fig. 9.—End result of treatment of fracture in the midhumerus in a young boy who sustained multiple fractures in an automobile accident.

Fig. 10.—In this patient, a radial nerve palsy developed, with a wrist drop (left hand). Neurolysis resulted in normal function of the hand.

treatment of the fracture consists of reduction and simple immobilization of the entire arm in a posterior splint. With proper support, bone union is rapid in infants.

Certain pathological conditions as solitary bone cyst (fig. 8), Paget's disease, osteomyelitis, metastatic carcinoma and sarcoma may predispose the arm to the spontaneous fracture of the shaft of the humerus. The patient, unaware of the disease process in the bone, learns of the condition for the first time when his arm breaks without any obvious reason.

There is a possibility of delayed union or nonunion in fractures of the mid portion of the humerus. Factors contributing to nonunion are interposition of the soft parts, improper application of the cast, or injury to the

blood supply to the humerus. If nonunion is well established, operative treatment to introduce a bone graft is indicated. To accomplish this, a competent surgeon should be consulted. Occasionally, fractures of the mid shaft are complicated by radial nerve paralysis (figs. 9 and 10) due to contusion of the nerve or late involvement by fibrous tissue or callus formation. This complication is observed in the event of a wrist drop or anesthesia between the thumb and index finger or inability to extend the proximal phalanges of the fingers. A cock-up hand splint is used to protect the overstretching of the extensor muscles of the hand. Neurolysis three months after injury usually results in a good prognosis.

Fractures of the shaft of the humerus may be transverse, spiral or oblique, depending on the force and direction of violence. Crushing injuries produce various types of comminuted fractures. Characteristic displacement of the fragments is produced by unopposed muscle action, depending on whether the injury is above or

Fig. 11.—Supracondylar fracture of the humerus with slight displacement in a boy, age 4. Treatment of this fracture consisted of gentle manipulation with the patient under anesthesia and application of a plaster cast with forearm flexed to a right angle.

below the insertion of the deltoid muscle. If the bone is fractured immediately above the deltoid insertion, the powerful axillary fold muscles, namely, the pectoralis major, teres major and latissimus dorsi, attached to the upper fragment, tend to draw it toward the body, while the deltoid muscle tends to draw the distal fragment out. In a fracture below the deltoid insertion, the proximal fragment is drawn out by the deltoid aided by the supraspinatus muscle.

The treatment of these fractures varies and is modified by the severity of the fracture. Simple traction and immobilization in a Thomas splint with the arm in the abducted position may be indicated. A plaster spica may be used early or late. In serious injuries, especially compound fractures with extensive lacerations and open wounds, the arm may be immobilized in a Thomas splint with moderate abduction of the upper arm, while the forearm, held at right angle flexion, is supported with adhesive tape traction. Skeletal traction is obtained by means of a screw inserted into the ulna just proximal to the tip of the olecranon process. At an appropriate time the traction setup is removed, and further immobilization is carried out by the use of a plaster spica. Occasionally a spiral fracture of the lower end of the humerus will require operative intervention for proper alinement

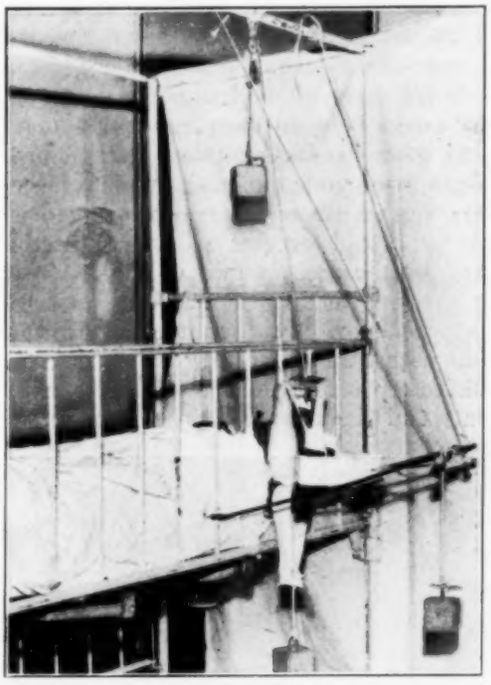

Fig. 12.—Photograph illustrating the skin traction suspension method used after manipulation for reduction of a severe supracondylar fracture of the humerus.

of the fragments. Surgical consultation is recommended. A bone plate may be necessary to hold the fragments in place.

Fig. 13.—Roentgenograms of a supracondylar fracture of the humerus treated by the method illustrated in figure 12. Patient had normal function of elbow. *A*, anteroposterior view and *B*, lateral view of original fracture. *C*, anteroposterior view and *D*, lateral view of elbow five years after injury.

6. Davis, G. G.: Applied Anatomy, ed. 4, Philadelphia, J. B. Lippincott Company, 1916.

INTERCONDYLAR, T OR Y FRACTURES OF THE LOWER END OF THE HUMERUS

These fractures are commonly seen in adults with the history of a severe traumatic injury. The deformity is pronounced because of the swelling of the soft tissues and the displacement of the fragments. Speed [3] recommends operative intervention for those cases in which the lower fragment of the humerus is split apart and the shaft enters between the pieces, for T and Y fractures and other irreducible cases. Every effort should be made to manipulate the fragments into place so that the integrity of the elbow joint may be restored. The fragments may be held together with nails or screws, wire or plates for the maintenance of the reduction. Van Gorder [7] recommends open reduction through a posterior approach in difficult supracondylar T fractures of the humerus. Fahey [8] states that open reduction is not satisfactory because of the difficulty in fixing the fragments and the attendant joint damage. With the

Fig. 14.—Roentgenograms of fracture of the capitellum with pronounced displacement and rotation of the fragment. A portion of the lateral condyle is also fractured.

patient under general anesthesia, manipulation may be attempted to improve the position of the fragments, but it is often necessary to resort to traction. Cubbins, Callahan and Scuderi [9] recommended skeletal traction with a screw used in the olecranon in these severe fractures in adults. Even with improved technics, restoration of function and position is not always perfect.

SUPRACONDYLAR FRACTURE OF THE HUMERUS

Supracondylar fractures of the humerus constitute one of the commonest elbow injuries in children. Many authors have stressed the importance of these serious fractures.[10] Fahey [8] in an analysis of 100 consecutive cases of elbow fracture in children has reported an incidence of 60 per cent. In the usual (extension type) supracondylar fracture, there is a typical deformity with extreme swelling about the elbow and pronounced restriction of motion. Severe blistering about the elbow

Fig. 15.—Roentgenograms taken eight weeks after operation showing good position and union of fragments.

may be seen. The fracture line is usually oblique but may be transverse. The long proximal fragment projects forward into the antecubital fossa, and its sharp edge

Fig. 16.—Fracture dislocation of ununited capitellum. The change in the angle of the elbow joint should be noted. This deformity may lead to a paralysis of the ulnar nerve in adult life (Courtesy of Dr. Edwin M. Miller).

may impinge on the brachial artery and median nerve. The short lower fragment is displaced backward, often rotated and may be displaced laterally or medially. Dicondylar or transcondylar fracture has a transverse plane of separation which crosses the olecranon fossa.

7. Van Gorder, G. W.: Surgical Approach in Supracondylar T Fractures of Humerus Requiring Open Reduction, J. Bone & Joint Surg. **22**: 278, 1940.

8. Fahey, J. J.: Fractures of the Elbow in Children, S. Clin. North America **25**: 61, 1945.

9. Cubbins, W. R.; Callahan, J. J., and Scuderi, C. S.: Compound Fractures of the Elbow Joint in Adults, Am. J. Surg. **42**: 627, 1938.

10. Boyd, H. R., and Altenberg, A. R.: Fractures About the Elbow in Children, Arch. Surg. **49**: 213 (Oct.) 1944. Hart, V. L.: Reduction of Supracondylar Fractures in Children, Surgery **11**: 23, 1942. Siris, I. E.: Supracondylar Fractures of the Humerus, Surg., Gynec. & Obst. **68**: 201, 1939.

In this type, lateral displacement of the distal fragment outward or inward is commoner than posterior.[8]

Before any treatment is initiated, careful examination of the extremity is necessary to determine the adequacy of the circulation and the presence of nerve injury. In the case of a simple supracondylar fracture with no displacement, treatment consists of immobilization in a plaster cast with the arm in flexion at a right angle. If there is slight displacement without separation of the fragments, mild manipulation is indicated for reduction (fig. 11). The cast may be removed in three to four weeks. The arm is then carried in a sling for a few additional weeks during which time physiotherapy is started.

In the more serious supracondylar fractures with pronounced displacement of the distal fragment, a good reduction is desirable to avoid early complications such as possible gangrene, Volkmann's ischemic paralysis [11] or peripheral nerve injuries, or late complications such as gross deformity (change in the carrying angle) or restriction of motion of the elbow joint. Conditions may exist that require early operative reduction. It must be emphasized that early attempts at reduction will give the best results. Gentle manipulation with the patient under general anesthesia will effect complete reduction in many instances; however, an occasional case will be difficult because of decided displacement of the fragments with extreme soft tissue swelling or because the fracture is many hours old. Under no circumstances should hyperflexion be employed for the reduction of a severely displaced supracondylar fracture.

The use of the Jones position of acute flexion of the elbow after reduction is obtained has been discarded in favor of the skin traction suspension setup suggested earlier by Dunlop [12] (figs. 12 and 13). Watson-Jones [13] immobilizes the supracondylar fracture after reduction in a posterior plaster splint with a collar and cuff sling, but he emphasizes that the elbow joint must never be acutely flexed. In a rather large series of severe supracondylar fractures during the past years, Miller and his associates have employed the traction suspension method with the use of a screw in the olecranon. This form of treatment has resulted in many successes which otherwise would not have been obtained by more conservative measures.[14] This method produces accurate reduction without adding injury to the soft tissues and minimizes the danger of vascular and nerve injuries. Smith [15] and others have recommended the use of Kirschner wire traction through the ulna, with overhead suspension, in an effort to obtain and maintain the reduction in badly displaced supracondylar fractures. Infrequently, in spite of this method of treatment and even with a decrease in the degree of flexion of the forearm, the radial pulse is absent or diminished and the hand is cool. The injection of the stellate ganglion with procaine hydrochloride (novocaine®) has resulted in surprisingly effective and prompt return of pulsations and warmth in the extremity. Several injections may be necessary.

The arm is immobilized for a period of three weeks in the traction suspension setup, after which it is immobilized in a plaster cast for a few additional weeks.

In the very late or malunited supracondylar fracture with considerable callus, operative reduction has been employed and has resulted in improvement of the fragments, but not always in restoration of perfect function. Change in the carrying angle with gunstock deformity (cubitus varus) may be corrected by osteotomy.

FRACTURE DISLOCATION OF THE CAPITELLUM

In children, serious injury to the outer side of the distal end of the humerus is seldom recognized because there is very little interference with movement of the joint. The physician by palpation is aware of a freely movable bony fragment on the lateral aspect of the elbow. The bone persists in displacement in spite of simple repeated manipulations. The result is failure of reduction. Speed and Macey [16] have recommended open reduction and internal fixation of some difficult fractures of the humeral condyle in children. In my experience, in almost all cases of fracture of the capitellum with dislocation and rotation of the fragment (a portion of the lateral condyle may be fractured with the capitellum), operative intervention gives an accurate reduction with restoration of the normal structure of the elbow joint (figs. 14 and 15). In spite of early accurate reduction, growth disturbances have been recorded. Improper reduction or nonunion of the capitellum will result in disturbance of growth of the lateral half of the distal end of the humerus with changes in the angle of the joint in adult life (fig. 16). Many years after the fracture a delayed palsy of the ulnar nerve may develop.[17] This condition will require transplantation of the ulnar nerve. The importance of the supracondylar fracture and the capitellar fracture is emphasized not only because the injuries are severe and require proper treatment, but also because the complications in these cases, whether early or late, are often extremely serious.[18]

FRACTURES OF THE INTERNAL EPICONDYLE

Fractures involving the medial or internal epicondyle occur in children until the age of 18 when the epicondyle fuses to the humerus. The injury may vary from a slight separation of the fragment, with minimal displacement and no rupture of the internal ligament of the elbow, to an extreme displacement, with avulsion of the epicondyle and an associated complete outward dislocation of the elbow.[13] With pronounced displacement of the fragment, the ulnar nerve is sometimes pulled into the joint with the epicondyle. This may result in partial or complete ulnar nerve paralysis. The treatment of these injuries is determined by the extent of the displacement of the fragments. Gentle manipulation may restore normal position in minimal displacements.

11. Blount, W. P.: Volkmann's Ischemic Contracture, editorial, Surg., Gynec. & Obst. **90**: 224, 1950.
12. Dunlop, J.: Transcondylar Fracture of Humerus in Childhood, J. Bone & Joint Surg. **21**: 59, 1939.
13. Watson-Jones, R.: Fractures and Joint Injuries, ed. 3, Baltimore, William Wood & Company, 1944, p. 482.
14. Miller, E. M.; Fell, E. H.; Brock, C.; Todd, M. C., and Requarth, W.: Progress in the Management of Severe Supracondylar Fractures of the Elbow, Ann. Surg. **113**: 1098, 1941.
15. Smith, F. M.: Kirschner Wire Traction in Elbow and Upper Arm Injuries, Am. J. Surg. **74**: 770, 1947.
16. Speed, J. S., and Macey, H. B.: Fractures of the Humeral Condyles in Children, J. Bone & Joint Surg. **15**: 1903, 1933.
17. Miller, E. M.: Late Ulnar Nerve Palsy, Surg., Gynec. & Obst. **38**: 37, 1924.
18. Miller, E. M.: Treatment of Severe Fractures of the Elbow, West. J. Surg. **42**: 139, 1934.

The arm is immobilized with a posterior splint and a sling for approximately four weeks. In cases with pronounced displacement of the epicondyle, surgical consultation is recommended. Open reduction should be done.

Young children with nonunion may experience local growth disturbance or a subsequent ulnar neuritis. This fracture does not alter the carrying angle of the elbow, since the epiphysis of the internal epicondyle is separate from those of the joint.

BEHAVIOR DISTURBANCES IN EPILEPTIC CHILDREN

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The frequency of convulsive disorders in childhood makes it extremely likely that every physician whose practice includes children will regularly be faced with their management. Many clinicians, however, and a significant portion of the literature on epilepsy appear to be largely preoccupied only with the control of seizures. The physician who is genuinely concerned with the welfare and future of his patient will wish to understand and deal with not only the most dramatic symptoms of the illness (usually the attacks of convulsions) but also other problems which are related to them. In many instances the behavior and social adjustment of epileptic children present difficulties which will challenge the physician's therapeutic skill. So many such children suffer from associated behavior disturbance that it seems worth while to focus attention on these in the present paper.

Behavior difficulties associated with diseases of or injuries to the central nervous system, such as epilepsy, fall into two general groups. First, there are those which are direct and primary expressions of disordered cerebral function, just as are the convulsions themselves. Such symptoms, presumably resulting from the same physiological changes that produce the syndrome known as epilepsy, should logically show some similarity from patient to patient. This is, indeed, the case in a cluster of primary behavior symptoms frequently seen in epileptic children, shortly to be discussed in some detail. In the second place, there are behavior symptoms, as there are in all acute and chronic illness, that are indirectly or secondarily associated with the basic disorder and represent the patient's personal reaction to being ill as well as to the way his illness is regarded by those about him. The precise nature of these secondary symptoms varies with the patient's personality and the way he and his illness are handled. Since these vary, the secondary symptoms are not necessarily identical in different patients. Some awareness of them and the reactions that produce them are essential, however, if the physician is to offer effective guidance in their management. Some general observations regarding such secondary symptoms will likewise appear subsequently.

Since this communication is addressed directly to the family physician or pediatrician who sees children in the office, rather than in an institution, and since the overwhelming majority of epileptic children seen in such circumstances will not show retardation or deterioration of intelligence or personality, it seems wise to confine the observations to behavior difficulties in intelligent and essentially physically intact patients subject to convulsive seizures.

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DEFINITION OF TERMS

Clinical as well as lay concepts of epilepsy have until recently been obscured by uncertainty, mysticism, prejudice, pessimism and other nebulae arising from the popular fear and superstition that are so often attached to human nervous and mental disorders that are poorly understood. The development of accurate diagnostic techniques, especially electroencephalography, and the synthesis of effective therapeutic preparations, mostly within the last 15 years, have contributed so largely to our understanding and control of such disorders as to free us from some of the unfortunate attitudes that previously so clouded our thinking on the subject. The persistence of some confusion, however, makes certain definition of terms an imperative introduction to any intelligent discussion of convulsive disorders in childhood.

An epileptic child may be described as one who is unusually susceptible to recurrent involuntary seizures of one sort or another. A child subject to convulsions may be described in precisely the same terms. "Epilepsy" and "convulsive disorder," for all practical purposes, may be considered synonymous. Neither implies an inevitably poor prognosis or a future outlook of mental deterioration or social incapacity. As is now well known, epilepsy describes a symptom of disordered central nervous system function and does not represent a disease entity.

Since we are to discuss behavior disturbances occurring in children, it must be pointed out that we can properly evaluate the behavior of an individual child only when we compare him with other children of similar age and development, rather than with some absolute theoretical standard of performance. Capacities for behavior develop as children mature, and what is normal and healthy at one age may be immature and abnormal if encountered at a later stage of development.

While seizures may be of many different sorts, in common pediatric practice we usually think of the three most commonly recognized types—grand mal, petit mal and psychomotor attacks. The last-named type represents essentially an electroencephalographic abnormality, more commonly referred to in adults than in children. Its definition is less clear than is that of grand mal or petit mal, and in children the terms "epileptic equivalents" or "behavior disturbances associated with convulsive disorders" are commonly used to describe psychomotor seizures. Since, as will be pointed out subsequently, many of the behavior difficulties encountered in children subject to convulsions are associated with symptoms of

an episodic, recurrent, central nervous system disorder rather than with the particular pattern of the seizures themselves, it does not seem urgent to digress at this point with a detailed description of seizure types, the major features of which are familiar to most practicing clinicians.

The general behavior that is to be presented as primarily symptomatic of epilepsy in children consists of a cluster of traits, which may be most adequately described in terms of its five component features. There is no single term that accurately describes the entire syndrome, and if there were it would not, for some time at least, be intelligible to parents and others from whom information must be secured as to the behavior of epileptic children in comparison with that of their nonepileptic siblings or companions. The presence of several, but not necessarily all five, traits contributes to the general pattern. No one or two of them alone are characteristic of this or any other psychological disorder. The five traits to be described more completely below appear to be (1) erratic variability in mood or behavior, (2) hypermotility, (3) irritability, (4) short and vaccilating attention span and (5) a rather selective difficulty in mathematics as a school subject.

The secondary symptoms, representing the child's reaction to his convulsive disorder and the way his handicap is regarded by his family and others in the community, being subject to more variables than the primary symptoms, do not fall into any such characteristic cluster. For some children the threat of being unexpectedly overwhelmed by a major seizure may inspire perennial dread or anxiety. For others, oversolicitude on the part of worried parents may hamper their activities and prove a source of irritation. For still others, exclusion from school and other community activities that are accepted as the birthright of youngsters in a democracy may provoke despair or resentment. This very variety in secondary reactions has led many students of epilepsy in childhood to conclude that there is never any specific behavior pattern for children subject to convulsions and that one must consider any apparent unusual reactions only in terms of psychological accompaniments of chronic illness.

THE PRIMARY BEHAVIOR DISTURBANCES

My opinion that there is a cluster of behavior traits that frequently occur in conjunction with epilepsy in childhood arose originally from my opportunity over a period of some years to compare the behavior of a great number of children with convulsive disorders and nonepileptic children sharing activities of a comprehensive program in a children's psychiatric hospital.[1] Concomitantly, information obtained in office practice while taking medical and psychiatric histories on children with convulsions, in which specific inquiry was made as to their behavior as compared to that of others in the family, led to similar conclusions. Moreover, there are many references in the literature that imply or directly suggest that others have made similar observations, though the reports may differ in terminology, emphasis and conclusions.

The five traits which were briefly enumerated above may now be described in more detail.

1. Erratic variability in mood and overt behavior implies an apparently unprecipitated, purposeless fluctuation in social adaptability occurring at longer or shorter, and usually irregular, intervals. The child who is old enough to express his own opinion of himself may speak of his "good and bad days." The mother may report that "for no good reason" on some mornings her child's disposition is conspicuously different from what it is on other days and go on to say that she knows from experience that it is likely that on certain days the child is going to have a difficult time. A teacher may observe that on some days or parts of days it seems to be much more difficult for a child to sit still in the classroom, to concentrate on his school work or to remember what he has learned previously. On such days he is often more irritable in his relationships with his classmates. Not only are the fluctuations in mood and behavior conspicuous, but also the lack of apparent external cause for them is particularly puzzling and often frustrating to the child, to his parents and to his teachers. This variability in disposition appears to be a basic characteristic of some epileptic children and very much colors and modifies the other behavior traits about to be discussed.

2. Hypermotility refers to gross motor activity, more extreme or more constant than is usually seen in other children of comparable age and development. The actual degree of hyperactivity may decrease as the child becomes older and maturer, but it still continues to be a conspicuous characteristic. There are many synonyms for such overactivity, such as excess energy, restlessness, drive, or "driveness."

3. Irritability (which is probably synonymous with irascibility) relates to the relative ease with which some persons become impatient, angry or aroused to aggressive, hostile, vindictive activity. It is so frequent a symptom in many sorts of emotional maladjustments that it would hardly be worthy of inclusion in the present category were it not for the degree with which it impresses many parents, teachers and other observers as being present in some epileptic children. It is, of course, also, of the several characteristics which we are discussing, one of the most likely to bring a child into conflict with his fellows. It seems to be subject to the variability that we have just discussed, and the fact that it occurs often without any relationship to the child's surroundings sometimes makes it difficult to understand.

4. Short attention span refers to a child's inability to concentrate, to apply himself continuously to a task or a matter of interest. Distractibility would be an equally appropriate term. In consideration of such a trait, due allowance must be made for the child's developmental level and the nature of whatever activity or task is supposed to be the focus of his attention at any particular time or in any particular situation. This characteristic is also subject to wide variations of the same unpredictable nature as those just discussed.

5. Selective difficulty with mathematics in the school situation is, of course, noted only in children whose school curriculum includes arithmetic. In older children the difficulty is most likely to be reported in situations calling for reasoning or problem solving, as contrasted

1. The Emma Pendleton Bradley Home, East Providence, R. I.

with such tasks as merely memorizing tables or processes. In some children of superior intelligence the presence of a reading or spelling disability may mask the importance of the arithmetic problem.

Earlier Reports.—It is interesting, in the light of the observations which have led to the present contribution, to refer to a report by Clark in 1918,[2] who noted many of the same behavior traits in children with convulsive disorders. Over a period of many years this author presented a great deal of evidence attempting to demonstrate that convulsions occurred only in individuals of a very definite type of personality. In this particular study he carefully questioned the parents of 50 children subject to convulsions who were seen as private patients, and he recorded a number of personality traits occurring in a significant proportion of them which he considered to be related to the problem of epilepsy itself. Among these, he noted that "a factor most frequently noted in the supersensitive, egoistic infancies of these individuals was the extreme lability of mood, 'one moment contented, the next irritable beyond power of appeasement.'" Clark seems to be describing the quality of variability in these remarks. "In at least a dozen cases and as school pupils these potential epileptics were restless, turbulent, argumentative and quarrelsome in the extreme," describes hypermotility and irritability, the latter characteristic being one which Clark expands with such phrases as "the majority of cases show irritability from birth." He further noted that "two-fifths showed a marked inability to concentrate their attention, so that they were usually behind in several studies, such as algebra and mathematics," a statement which specifically refers to short attention span and difficulty in arithmetic, as mentioned above. He stressed the fact that he was concerned with children who were not mentally retarded, and in spite of his emphasis that the various characteristics that he delineated were earmarks of a very special personality, he noted considerable variation in attributes. Moreover, without the benefit of the many years of accumulated child guidance experience now available since he made his study, he failed to discriminate between symptoms that might be characteristic of the neurological disorder itself, as contrasted with those which are more indicative of the reaction of the child to his illness, the concern of his parents or problems of adjustment he faces in the community.

Electroencephalographic Evidence.—Numerous reports of electroencephalographic studies of maladjusted children contain descriptions of behavior of the type just described in association with electroencephalographic tracings similar to those seen in epileptic children. Jasper, Solomon and Bradley [3] in 1938 described a group of 30 children "whose behavior might be described as hyperactive, impulsive, highly variable and involving spontaneous misbehavior apparently unrelated to environmental situations," of whom 70 per cent showed electroencephalographic records judged to be epileptiform. Among several patients reported on by Lindsley and Bradley [4] were three whose electroencephalograms were of the convulsive type, who had actually suffered from seizures and for whom "the main complaint and major symptoms while in the hospital were primarily those of unacceptable behavior, such as hyperactivity, destructiveness, emotional outbursts and negativism." Strauss, Rahm and Barrera [5] reported the cases of a number of children who showed cortical dysrhythmias, who had been known to have seizures, and in some of whom symptoms included episodic temper outbursts showing a relatively normal type of behavior between outbursts. Others who report electroencephalographic studies and describe similar behavior characteristics in association with tracings of the epileptic type are Lindsley and Cutts,[6] Brown and Solomon,[7] Bradley,[8] and Jenkins and Pacella.[9] The general type of behavior described in several of these reports lends weight to my contention that there is a behavior syndrome apparently directly related to the neurophysiological disturbances that result in various types of seizures and that may be graphically recorded in the electroencephalogram.

In a recent discussion, Jasper [10] notes "the electroencephalogram has served to broaden the field of epilepsy to include many episodes of thought and behavior." He also adds "any portion of the brain occupied by epileptiform discharge is lost to the individual for normal adaptive or integrative action of that area." Since fluctuation and variability are characteristic of the abnormalities recorded in the epileptic type of electroencephalogram, we can sense a possible explanation of the variability in behavior and short attention span described as part of the syndrome considered as a primary behavior characteristic of epileptic children.

Similarity to Organic Behavior.—Many writers on epilepsy in childhood mention the fact that behavior difficulties, when present in this condition, often resemble those seen in patients with organic brain damage. The behavior referred to is apparently more or less the same syndrome under discussion in this section. Bender's [11] comprehensive review well summarizes the essential features. She speaks of "hyperkinesis which is not modifiable by psychotherapy" and refers to "organic driveness," a term first introduced by Kahn and Cohen [12] some years earlier. They describe it as a behavior syndrome, supposedly associated with brain stem damage and characterized by hyperkinesis, inability to maintain

2. Clark, L. P.: The True Epileptic, New York Med. J. **107**: 817 (May 4) 1918.

3. Jasper, H. H.; Solomon, P., and Bradley, C.: Electroencephalographic Analyses of Behavior Problem Children, Am. J. Psychiat. **95**: 641 (Nov.) 1938.

4. Lindsley, D. B., and Bradley, C.: Electroencephalography as an Aid to Understanding Certain Behavior Disorders of Childhood, Ztschr. f. Kinderpsychiat. **6**: 33 (July) 1939.

5. Strauss, H.; Rahm, W. E., Jr., and Barrera, S. E.: Studies on a Group of Children with Psychiatric Disorders, Psychosom. Med. **2**: 34 (Jan.) 1940.

6. Lindsley, D. B., and Cutts, K. K.: Clinical and Electroencephalographic Changes in a Child During Recovery from Encephalitis, Arch. Neurol. & Psychiat. **45**: 156 (Jan.) 1941.

7. Brown, W. T., and Solomon, C. I.: Delinquency and the Electroencephalograph, Am. J. Psychiat. **98**: 499 (Jan.) 1942.

8. Bradley, C.: Problem Children: Electroencephalographic Diagnosis and Pharmacologic Treatment, Connecticut M. J. **6**: 773 (Oct.) 1942.

9. Jenkins, R. L., and Pacella, B. L.: Electroencephalographic Studies of Delinquent Boys, Am. J. Orthopsychiat. **13**: 106 (Jan.) 1943.

10. Jasper, H. H.: Electroencephalography in Epilepsy, in Hoch, P. H., and Knight, R. J.: Epilepsy, New York, Grune & Stratton, Inc., 1947, pp. 182 and 188.

11. Bender, L.: Organic Brain Conditions Producing Behavior Disturbances, in Lewis, N. D. C., and Pacella, B. L.: Modern Trends in Child Psychiatry, New York, International Universities Press, Inc., 1945, pp. 155-192.

12. Kahn, E., and Cohen, L. H.: Organic Driveness: A Brain Stem Syndrome and an Experience, New England J. Med. **210**: 748 (April 5) 1934.

quiet attitudes, abruptness in movements and explosive release of motor activity. Among their case reports is that of a child who showed constant motion with pressure to speech, distractability and "unpredictable oddities in executing commission." Ewalt [13] comments on the similarity of this and other "organic behavior" to what is seen in epileptic children, illustrating his point with case reports. Strauss and Lehtinen [14] describe the brain-injured child as erratic, uncoordinated and uninhibited. Rosenfeld and Bradley [15] itemize the behavior of children of unimpaired intelligence who have suffered anoxia in infancy as being high lighted by "unpredictable variability in mood, hypermotility, compulsiveness, short attention span, fluctuant ability to recall material previously learned and conspicuous difficulty with arithmetic in school." Possibly the same throwing out of control of centers facilitating adaptive and integrating behavior described by Jasper [10] as related to the behavior of epileptic individuals also occurs as the result of brain damage. The similarities of behavior in epileptic children, even in the absence of objective evidence of brain damage, may be dependent on the same mechanism as that occurring in known brain-injured patients.

SECONDARY BEHAVIOR DISTURBANCES

The behavior that, because of its frequency and consistency in association with convulsive disorders, I have been discussing in terms of primary characteristics may not be conspicuous in some epileptic children. Moreover, these traits will probably seem most relevant to convulsive disorders to clinicians who have had opportunities to directly compare the behavior of epileptic and nonepileptic children living in the same environment or have focused on such behavior in taking clinical histories. They may not be equally apparent when studies are carried out from different viewpoints. In reports oriented largely from the psychologist's point of view, Gahagan and Sullivan,[16] Price, Kogan and Tompkins,[17] Lisansky [18] and Kogan [19] imply that epileptic children have no personal characteristics which distinguish them from other children of similar background and general capabilities. Lennox [20] and Bridge [21] in numerous contributions based on extensive clinical experience emphasize the fact that children who are the victims of chronic illness, particularly when its major symptoms occur dramatically and unpredictably, are likely to establish behavior patterns based on their personal reactions to their disorder and the way it is handled by those about them. I would suggest that such reactions be considered secondary to epilepsy, but they are certainly important for clinical consideration in every patient, whether or not the traits previously described are likewise conspicuous.

The physician who is genuinely concerned with his patient's welfare will always keep in mind the fact that all human beings have their own individual feelings and attitudes about their illness and also about the way other persons deal with them and their disorders. In the case of epileptic children these may be dread of seizures themselves, particularly if they are of major proportions or tend to occur while the child is in public places, from which repeated episodes may eventually result in his exclusion. In the case of other children, the parents, who must inevitably be concerned about seizures, regardless of the degree of their severity or crippling nature, may communicate their anxiety to the patient and thus aggravate whatever concern is already disturbing his emotional equilibrium. Unfortunately, public attitudes toward seizures and their victims are in many quarters unenlightened, and many epileptic children are being excluded from activities in which they could profitably engage. Such restrictions in some instances stimulate compensatory behavior reactions that may be a problem for the patient or his family. The possibility that certain anticonvulsive medications may, for some children, have an unfavorable effect on behavior must not be overlooked.

The reaction of children to these and other factors has been well summarized by Lennox [20] and by Bridge,[21] and the latter particularly has dealt with the general management of these problems in a comprehensive manner.

TREATMENT BY THE PHYSICIAN

The ultimate aim of treatment in any disorder is to restore the patient to as full participation in all desirable life activities as is consistent with his health. In the case of epilepsy, medical treatment aimed at control rather than cure of seizures is usually the first objective of most physicians. Since, however, therapy must usually be continued over long periods of time, it must not be pushed to such an extent that, as the result of whatever regimen is employed, the child is denied a reasonably full participation in all those activities that at successive developmental stages are essential to his physical, intellectual and emotional growth. It is not my intention to critically evaluate any of the accepted medical programs designed to eliminate the major symptoms of seizures. I would like, however, to point out that large doses of sedative drugs may seriously interfere with effectual mental functions, and that too drastic restrictions of diet or activity may set a child too far apart from the stimulating companionship of his fellows and the benefits of a full educational program. Moreover, the physician, in his own anxiety to be thorough both diagnostically and therapeutically, may by his manner of handling the situation engender more anxiety than reassurance in both parents and children. Supervising adequate treatment of an illness that has for centuries been dreaded because it has been poorly understood is an art that calls for the physician's reassurance and enthusiastic support of the grow-

13. Ewalt, J. R.: Organic Behavior Problems, Texas Rep. Biol. & Med. 3: 247 (Summer) 1945.
14. Strauss, A. A., and Lehtinen, L. E.: Psychopathology and Education of Brain Injured Children, New York, Grune & Stratton, Inc., 1947.
15. Rosenfeld, G. B., and Bradley, C.: Childhood Behavior Sequelae of Asphyxia in Infancy, with Special Reference to Pertussis and Asphyxia Neonatorum, Pediatrics 2: 74 (July) 1948.
16. Sullivan, E .B., and Gahagan, L.: On Intelligence of Epileptic Children, Genet. Psychol. Monogr. 17:309, 1936.
17. Price, J. C.; Kogan, K. L., and Tompkins, L. R.: Prevalence and Incidence of Extra-Mural Epilepsy, in Hoch, P. H., and Knight, R. L.: Epilepsy, New York, Grune & Stratton, Inc., 1947, pp. 42-47.
18. Lisansky, E. S.: Convulsive Disorders and Personality, J. Abnorm. & Social Psychol. 43: 29 (Jan.) 1948.
19. Kogan, K. L.: The Personality Reaction Pattern of Children with Epilepsy, in Epilepsy, A. Res. Nerv. & Ment. Dis., Proc., Baltimore, Williams & Wilkins, 1947, vol. 26, pp. 616-630.
20. Lennox, W. G.: Seizure States, in Hunt, J. M.: Personality and Behavior Disorders, New York, The Ronald Press Co., 1944, pp. 953-956; Therapeutic Agents in the Treatment of Epileptiform Seizures, in Advances in Pediatrics, New York, Interscience Publishers, Inc., 1948, vol. 3, pp. 91-130.
21. Bridge, E. M.: Epilepsy and Convulsive Disorders in Children, New York, McGraw Hill Book Co., 1949.

ing child, quite as much as it does for his protection. An awareness of and willingness to deal with both the primary and secondary behavior characteristics of the patient is an important portion of the physician's responsibility, if the child's seizures are to be controlled at the same time that he is participating in as full a program of normal childhood activities as is possible.

Treatment of Primary Behavior Disturbances.—If the cluster of symptoms referred to above constitute a handicap to successful school or community life, they must be one object of treatment. Since these symptoms presumably are the result of neurophysiological disturbances of the same general nature that also produce seizures, they will not, aside from their recognition and acceptance as such, yield to psychotherapeutic measures alone and must be dealt with medically. The literature on their pharmacologic control is recent but encouraging. It is interesting that little mention is made of the effect of the older drugs, particularly bromides and phenobarbital, on behavior, except to indicate that overdosage will aggravate behavior difficulties, primarily by dulling sensibilities and temporarily retarding effective intellectual function. In my experience, based on innumerable reports from parents and nurses who are in daily intimate contact with epileptic children, phenobarbital, even in average nonsedative doses, results in increased irritability and hyperactivity and, at times, interferes with effectual ability to concentrate attention upon specific tasks, such as school work. The interesting and convincing study of Lindsley and Henry [22] bears this out. They found that when the effect of conventional therapeutic doses of phenobarbital on behavior was compared under controlled conditions with that of other drugs commonly used in children with convulsive disorders, it resulted in less satisfactory adjustment than when no medication was given.

After the introduction of diphenylhydantoin (dilantin®) sodium into clinical practice, a number of observers noted that it frequently had a favorable effect on behavior, even when seizures themselves were not a major problem. The reports of Putnam and Merritt,[23] Solomon,[24] Brown and Solomon,[7] Bradley [8] and Brill and Walker,[25] among others, present evidence of this nature. The major effects were those of decreased irritability, control of hypermotility and occasional decrease in the variability of behavior noted above as primary symptoms. Other anticonvulsive drugs reported as having similar beneficial effect on children with seizures, or those whose electroencephalograms were of the "epileptic" type, are trimethadione (tridione®) reported by Perlstein and Andelman,[26] methylphenylethyl hydantoin (mesantoin®) as noted by Tietz [27] and phenacetylurea ("phenurone") studied by Livingston and Kadji.[28]

In my experience, borne out by the controlled studies of Lindsley and Henry,[22] the most effective preparations for the control of the primary behavior disturbances have been the amphetamines, notably racemic amphetamine (benzedrine®) sulfate and its dextrorotatory isomer known commercially as dexedrine® sulfate. These have been extensively reported in a recent article,[29] in which benzedrine® was found to be more efficient than dexedrine® in epileptic children. These preparations in rather full adult doses (10 to 20 mg. daily in the morning) even in younger children often dramatically reduce the variable swings of mood and activity so frequently seen as part of the primary behavior disturbance. They may also increase attention span, with resulting favorable effect for older children in arithmetic achievement. Since these drugs are central nervous system stimulants, and with the exception of isolated reports have not been notably effective in the control of seizures themselves, it is thought that their favorable effect on behavior is associated with their known stimulation of mood, possibly rendering variations in sensitivity and irritability less disturbing to the patient. The amphetamines may always be used, when indicated, in conjunction with conventional anticonvulsive medical regimens, their major drawback being their inhibition of appetite for food. Occasionally, when large doses of sedative drugs are employed, their stimulating action may neutralize annoying soporific effects, as illustrated in one of Bradley's case reports.[30]

Treatment of Secondary Symptoms.—Secondary symptoms, representing the child's reaction to his illness and the emotional atmosphere in which he finds himself, are proper material for psychotherapeutic measures. The essentials of their effectual handling have been suggested repeatedly above. These may be summarized by advocating control of seizures without overdosage with sedative drugs, helping the child and his parents understand and realistically accept his illness with a minimum of crippling emotional overtones and assuring the patient of as full and free a program of all usual childhood activities as possible. Frequently this full program in school and in the community will require that the physician contribute to the enlightenment of school personnel as to the nature of the child's illness, its harmlessness as far as other children (and their parents) are concerned and the contribution to the patient's total welfare, development and happiness that acceptance into community activities assures. Information about epilepsy is available to lay readers through such organizations as the National Epilepsy League, and the informative volumes by Lennox [31] and Putnam [32] are enthusiastically recommended.

CONCLUSION

Convulsions and their accompanying behavior disturbances are still a problem for many children. However, our increasing understanding of the basis of epilepsy through modern advances in neurophysiological tech-

22. Lindsley, D. B., and Henry, C. E.: The Effect of Drugs on Behavior and the Electroencephalograms of Children with Behavior Disorders, Psychosom. med. **4**: 140 (July) 1942.
23. Putnam, T. J., and Merritt, H. H.: Dulness as an Epileptic Equivalent, Arch. Neurol. & Psychiat. **45**: 797 (May) 1941.
24. Solomon, P.: The Physician's Status in Child Guidance Work, New England J. Med. **227**: 427 (Sept. 17) 1942.
25. Brill, N. Q., and Walker, E. F.: Psychopathic Behavior with Latent Epilepsy, J. Nerv. & Ment. Dis. **101**: 545 (June) 1945.
26. Perlstein, M. A., and Andelman, M. B.: Tridione: Its Use in Convulsive and Related Disorders, J. Pediat. **29**: 20 (July) 1946.
27. Tietz, E. B.: The Use of Medicine in the Behavior Disorders, Woman's M. J. **53**: 17 (Aug.) 1946.
28. Livingston, S., and Kadji, L.: The Use of Phenurone in the Treatment of Epilepsy, J. Pediat. **36**: 159 (Feb.) 1950.
29. Bradley, C.: Benzedrine and Dexedrine in the Treatment of Children's Behavior Disorders, Pediatrics **5**: 24 (Jan.) 1950.
30. Bradley, C.: Treatment of the Convulsive Child in a Children's Psychiatric Hospital, Nerv. Child. **6**: 76 (Jan.) 1947.
31. Lennox, W. G.: Science and Seizures, New York, Harper & Brothers, 1946.
32. Putnam, T. J.: Convulsive Seizures: A Manual for Patients, Their Families and Friends, Philadelphia, J. B. Lippincott Company, 1943.

niques and our potential ability to control and eliminate seizures themselves through the many new therapeutic agents that have become available in recent years should give us confidence in the medical management of these disorders. If, in addition, the feelings and behavior of epileptic children may be considered and constructively handled as has been suggested, there is ample cause for optimism. The well informed and alert pediatrician or family physician may well impart this to those who share with him the responsibility for epileptic children.

SUMMARY

Children who are subject to convulsions may have behavior difficulties of two general sorts. There are often behavior symptoms that are the primary, direct result of the neurophysiological disturbances that may be recorded electroencephalographically, and that are also presumably directly related to the seizures themselves. Such behavior symptoms are best treated medically, the most effectual preparations at present available for this purpose being the amphetamines. Other behavior disturbances, representing the child's reaction to being ill and to the way he is handled by those about him, may be considered as secondary symptoms; these are less specific in nature and must be treated at the psychological level. Adequate medical management of the epileptic child involves consideration of his behavior and emotional reactions, in addition to therapy designed to control his seizures.

ABSTRACT OF DISCUSSION

DR. WILLIAM W. BELFORD, San Diego, Calif.: The facts presented are the results of over 15 years of study and work with the problems of children subject to convulsions and the problems of their parents and environment. Many drugs and forms of treatment are presented each year, but few are so well studied and tried out and proved by use. Often the school teachers and nurses need instruction and encouragement in the care of these children such as only physicians can give them. A visit with them does both the physician and the child much good and can iron out much friction and misunderstanding. More time spent with the parents in encouraging and explaining the problems to them is just as helpful as the drugs that we prescribe. The burden of epilepsy is far greater than just drug treatment and the daily problems of living. Let me urge that the diagnosis of epilepsy be made with great care. It is so hard to correct a mistaken diagnosis once it is put on a child. Those of you who deal with children and adults through their lives are quite aware of the tag of epilepsy that prevents someone just out of school or a young adult from getting a job.

DR. E. D. ANDERSON, Minneapolis: With the advance in knowledge of the diagnosis, prognosis, and treatment of epilepsy, and with a better understanding of the psychological problems of the epileptic and his family and the effect that they can have upon the course of the disease, the medical profession is assuming a more positive and hopeful attitude. Unfortunately, many of us still confine our treatment to the giving of drugs, and neglect the equally important part of therapy which Dr. Bradley presented; namely, the prevention and treatment of the emotional and behavior difficulties which these children so frequently have. In my experience, the biggest factor in helping the epileptic child to adjust to his illness is the understanding and attitude of the parents to the disease and to their child. Unless they can be helped to understand their own emotional problems connected with the illness, it is almost impossible to help the child. One of the most common and damaging emotional problems that occurs in these parents is a feeling of defeatism. When the parents have this attitude, the child is almost bound to develop the same feeling. It is wrong not to give the encouragement of hope which our present prognosis of treatment gives us the right to do. Many parents develop feelings of anxiety regarding the physical welfare of their child because of the seizures and momentary lapses of consciousness he has and the danger of injury in traffic and at play. Unless the parents are given proper guidance, they are likely to restrict the child's activities far beyond what is necessary. We must try to help them see that it is necessary to take certain chances in order that the child may lead as near normal a life as is possible. Not to do so will invariably lead to emotional trauma, with resulting behavior and personality problems. Another common form of anxiety which the parents have is the fear that their child will deteriorate mentally. As a result, they may do one of two things. To reassure themselves that the youngster is bright, they constantly push him far beyond his capacity to excel in school. Thus, he may become frustrated, discouraged, or resentful. Other parents, instead of pushing, hold him back. They make all decisions and do everything for the child, thereby preventing him from becoming independent. Some parents have feelings of guilt regarding the child's illness. Whatever the cause of the feelings of guilt, the parent is likely to be overly protective and indulgent and the child becomes overdependent, with resulting increased emotional and behavior problems. Frequently parents of an epileptic child develop feelings of shame regarding the illness. Such parents have a tendency to withdraw from normal social, community and civic activities. They particularly need the help which such activities will give. If you and I do nothing but help such parents to see that epilepsy should not be considered a thing of shame and help them to keep interested and active in the normal activities of life, we will have done a great deal. One or more of such problems are almost bound to arise in the parents of epileptic children. If they are not prevented or controlled, the parents are going to become emotionally insecure and unstable, and they will be unable to adequately help their child meet the difficult problems which will face him. Physicians are in a strategic position to help these parents by giving them warm understanding and wise counsel and guidance.

DR. CHARLES BRADLEY, Portland, Ore.: I do not know how many children who are subject to seizures have behavior difficulties, particularly those five cardinal traits that we mentioned. My guess would be one-half to two-thirds. There are just enough children who do not have problems of that sort, to make it possible for many of us to say that there is no characteristic behavior of the epileptic child. There are no persons in relation to the young child who are as important to him as his own parents; their support and enthusiasm are even more important than that of the family doctor. If we have the confidence of the parents and a reasonable acquaintance with some of these things, we can offer our patients more assurance and encouragement, and engender less anxiety in them and the parents than has been the case in the past.

Occiput Posterior.—At present there is general agreement among students of the problem of the occiput posterior position insofar as most of the practical aspects are concerned. It is a normal, frequently occurring position and radical interference with it is no longer justified. With competent handling of the occiput posterior, the safety of mother and baby is quite comparable to that obtained with other positions. . . . The rule of the clinic at the University of Minnesota may be quickly stated. Occiput posteriors are left alone unless a specific indication for interference presents itself. The usual indication is lack of progress with the head at the outlet. If the head can be easily rotated with the hand, this is done and the patient is given further opportunity to deliver spontaneously. If it can be gently rotated with only the fingers of one hand on the forceps, this is done. If any resistance to rotation is encountered, delivery is carried out as a posterior and usually after deep episiotomy.—John L. McKelvey, M.D., and Eugene J. Diefenbach, M.D., The Obstetric Significance of the Posterior Occiput Position, *Postgraduate Medicine*, March 1951.

OBSERVATIONS ON ACUTE POLIOMYELITIS WITH RESPIRATORY INSUFFICIENCY

Fred Plum, M.D.
and
Harold G. Wolff, M.D., New York

In a series of 50 adult patients with acute poliomyelitis managed at the New York Hospital in 1949, 17 needed artificial respiration. Of these 17, nine had respiratory obstruction due to partial or complete paralysis of swallowing or coughing. The respiratory exchange of oxygen and carbon dioxide was intensively studied in this entire group of patients. The effects of the rapid rocking bed, the cuirass respirator and the tank respirator were ascertained on those in whom respiratory decompensation developed. In this preliminary communication some of the observations are reported.

These patients were a severely ill group, many of whom were referred to the New York Hospital because of the desperate nature of their illness. Eight of the 17 died of rapidly progressive poliomyelitis, which both involved the innervation of the peripheral respiratory apparatus and extensively destroyed brain stem centers. Death was due either to circulatory collapse, apparently the result of involvement of the medullary reticular substance by the virus, or to the effects of hypoxia and hypercapnia accompanying respiratory failure.

OBSERVATIONS ON CIRCULATORY AND RESPIRATORY FAILURE

Baker and associates [1] have shown that cardiovascular signs and symptoms are consistently associated with severe damage to more than 19 per cent of the large reticular cells of the medulla. In our experience, arrhythmias and shock due to failure of neurogenic cardiovascular regulation proved unresponsive to therapeutic measures, such as administration of the digitalis glycosides or phenylephrine (neo-synephrine®) and parenteral injection of fluids.

In contrast to the discouraging prognosis offered by circulatory failure, the ill effects of respiratory insufficiency could often be prevented or reversed, and therefore the maintenance of a physiologic respiratory exchange was given primary attention.

Effects of Hypoxia and Hypercapnia.—In dealing with poliomyelitis, the importance of avoiding hypoxia and the dangers attendant on the hypoxic state have in general received greater emphasis than have the incidence and sequelae of carbon dioxide retention. Hypoxia results in increased capillary permeability,[2] pulmonary edema,[3] cardiovascular collapse [4] and damage to the central nervous system.[5] High levels of carbon dioxide in the blood (hypercapnia) result from inadequate alveolar elimination of the gas and if not reduced lead to blood acidosis, headache, hypertension,[6] disorientation and loss of consciousness.[7] Hypercapnia may also depress the respiratory center [8] and cause vascular collapse.[9] Nearly all these effects of hypoxia or hypercapnia may further interfere with respiratory gas exchange or intensify the severity of an acute illness. The prevention or reversal of even borderline respiratory decompensation is thus of first importance in managing patients with acute poliomyelitis.

Evaluation of Respiratory Insufficiency.—In evaluating the oxygenation of these patients with acute poliomyelitis, both the efficiency of respiratory gas exchange and the ability to move air in and out of the lungs were repeatedly ascertained. Arterial oxygenation was followed by studies with the oximeter (which photoelectrically measures oxyhemoglobin content),[10] and these determinations were standardized by direct arterial blood gas analysis. Carbon dioxide exchange was evaluated by frequent determinations of venous plasma carbon dioxide-combining powers and periodic estimations of arterial carbon dioxide contents. Alveolar air samples were also analyzed. Vital capacity was measured with a waterless calorimetric spirometer.

Marked failure of adequate elimination of carbon dioxide occurred in at least four well oxygenated patients in the present group. These patients, all of whom were receiving oxygen therapy, maintained arterial oxygen saturations of 95 to 100 per cent despite venous plasma carbon dioxide-combining powers of 85 to 100 volumes per cent and similarly elevated arterial carbon dioxide contents. They suffered headache, hypertension and disorientation during the time of increased blood carbon dioxide levels, and these symptoms were reversed in three by increasing ventilation and eliminating the accumulated carbon dioxide.

Measurement of Vital Capacity.—Observations on acutely ill adult patients indicated that no significant threat to adequate gas exchange existed until the vital capacity fell to 1,000 or 1,200 cc., since the patients studied consistently maintained physiologic levels of their respiratory gases when their vital capacities exceeded this

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7. Seevers, M. H.: The Narcotic Properties of Carbon Dioxide, New York State J. Med. **44**: 597, 1944.

8. (*a*) Comroe, J. H., Jr., and Dripps, R. D.: Artificial Respiration, J. A. M. A. **130**: 381 (Feb. 16) 1946. (*b*) Beecher, H. K., and Murphy, A. J.: Acidosis During Thoracic Surgery, J. Thoracic Surg. **19**: 50, 1950.

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amount. When 1,000 to 1,200 cc. was reached, however, arterial oxygen saturations and venous plasma carbon dioxide-combining powers were more closely followed, since it was observed that when the patient's paralysis was still progressing respiratory decompensation frequently appeared shortly after this point. Studies with the spirometer [11] on a group of adult respirator patients convalescing from poliomyelitis demonstrated that they were consistently able to meet their breathing requirement without any artificial respiration or supplementary oxygen when their vital capacities climbed to the low level of 600 to 700 cc. However, their breathing requirements were less than those of acutely ill patients, in whom infection, fever and anxiety increased metabolic demands, so that a direct correlation could not be made between these figures and the need for a respirator in acute ventilatory insufficiency.

Detection of Hypoxia.—Since cyanosis may not be present until arterial oxygen saturations fall to 80 per cent or less,[12] the oxygen content of arterial blood determined either by blood gas analysis or the oximeter provided the only reliable index of low grade hypoxia. With the patient breathing 100 per cent oxygen for at least five minutes, arterial blood was withdrawn for analysis and the oximeter placed on the ear. The oximeter was thus standardized to the patient's degree of oxygen saturation at that time, and future changes in oxygen saturation could be immediately and accurately determined. A drop of more than 5 to 8 per cent in the arterial oxygen saturation when the patient was changed from inhaling 100 per cent oxygen to breathing room air was taken to signify anoxemia.[13] When a patient breathing room air had an oxygen saturation of 94 per cent or less,

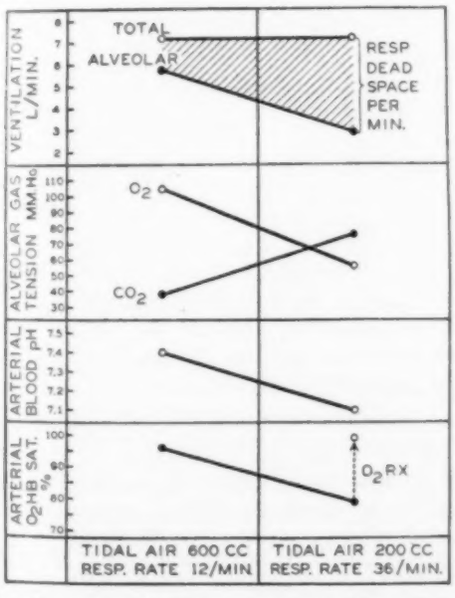

Chart 1.—Mechanism of alveolar carbon dioxide accumulation and blood acidosis in reduced alveolar ventilation. Despite the fact that total ventilation remains constant, alveolar ventilation falls sharply as tidal air decreases and the respiratory rate increases. Carbon dioxide, as a result, is not eliminated, and the blood pH shifts to a more acid level. Oxygen therapy corrects anoxemia but does not appreciably affect the accummulation of carbon dioxide.

oxygen therapy was always instituted. Most patients, of course, received oxygen therapy before this degree of anoxemia occurred. Oxygen was delivered at a rate of 4 to 8 liters a minute by nasal catheter. By the use of the oximeter to complement direct arterial blood gas analysis, continuous accurate evaluation of oxygenation was possible. The need for many technically difficult and time-consuming direct blood studies was eliminated.

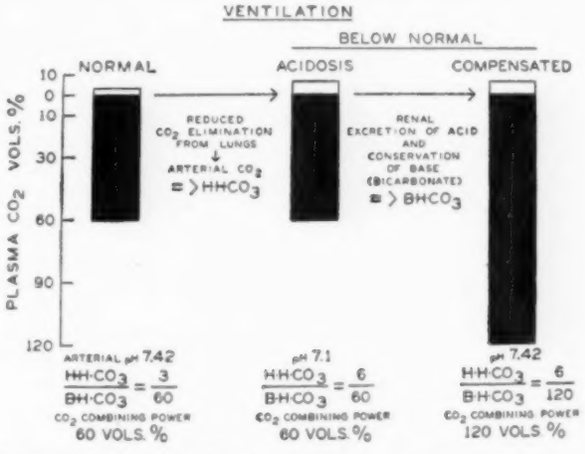

Chart 2.—Mechanism of blood acidosis in carbon dioxide retention, and development of a high venous plasma carbon dioxide-combining power in renal compensation of respiratory acidosis. Increased alveolar carbon dioxide is equal to increased arterial H_2CO_3 (carbonic acid), and the arterial pH falls to 7.1. As the venous plasma carbon dioxide-combining power rises, owing to renal conservation of base, the arterial pH returns to the normal value of 7.42.

Detection of Carbon Dioxide Retention and Its Significance.—The mechanism of carbon dioxide retention in these patients with ventilatory reduction and the effects of this retention on blood pH are diagrammed in chart 1, which hypothetically outlines the course in one of the patients studied. The respiratory dead space (approximately 150 cc.) had to be filled on each inspiration before any fresh gas reached the alveoli, and the dead space remained essentially the same, even though tidal volumes diminished. Therefore, when tidal volumes fell, practically the entire reduction in the amount of air breathed was at the expense of alveolar ventilation. When, as in the example cited in chart 1, tidal volume fell from 600 to 200 cc., the entire 400 cc. of each breath was lost to alveolar gas exchange, and only 50 cc. (i. e., 200 cc. tidal volume minus 150 cc. dead space) of inspired gas flushed the alveoli.

As alveolar ventilation was reduced, oxygen tension fell and carbon dioxide tension rose in the alveoli and therefore in arterial blood. Carbon dioxide, because of its greater molecular weight, diffuses less rapidly than oxygen. Thus, although oxygen therapy raised the alveolar oxygen tension and arterial oxygen saturation to normal levels by replacing inert nitrogen in inspired air, carbon dioxide could be eliminated only by increasing tidal volume or excessively increasing the respiratory rate, thereby increasing alveolar emptying. Since the pH of the blood is dependent largely upon the equilibrium established between free carbonic acid (H_2CO_3) and

11. Whedon, D. S., and Plum, F.: Unpublished data.

12. Comroe, J. H., and Botello, S.: The Unreliability of Cyanosis in the Recognition of Arterial Anoxemia, Am. J. M. Sc. **214**:1, 1947.

13. Godfrey, L.; Pond, H. S., and Wood, F. C.: The Millikan Oximeter in the Recognition and Treatment of Anoxemia in Clinical Medicine, Am. J. M. Sc. **216**:605, 1948. Elam, J. O.; Hemingway, A.; Gullickson, G., and Visscher, M. B.: Impairment of Pulmonary Function in Poliomyelitis: Oximetric Studies in Patients with Spinal and Bulbar Types, Arch. Int. Med. **81**:649 (May) 1948.

combined carbonic acid ($BH.CO_3$), as the carbon dioxide retained was converted to carbonic acid, the blood pH shifted to a more acid level (chart 2). This shift in blood pH occurred simultaneously with carbon dioxide retention.

The plasma carbon dioxide-combining power, reflecting, as it does, available base, largely in the form of bicarbonate, for combination with carbonic acid, rose above its normal level of 60 volumes per cent as the kidneys excreted other acid salts and conserved bicarbonate. Thus, in contrast to the usual metabolic acidosis, where carbon dioxide is blown off by the lungs and the carbon dioxide-combining power falls, in the respiratory acidosis due to inadequate carbon dioxide elimination from which these patients suffered the carbon dioxide-combining power was high. Electrolyte acidosis, marked by a high carbon dioxide-combining power and a highly acid pH of the urine, is peculiar to states of reduced ventilation; and since renal compensation is a relatively slow process, blood acidosis persists until the ratio of free carbonic acid to combined carbonic acid is restored at 20:1. This may take several days.

Carbon dioxide-combining powers and urinary pH values were, therefore, followed closely in all patients suspected of ventilatory insufficiency. Arterial carbon dioxide contents were periodically ascertained to determine the exact status of carbon dioxide respiration.

OBSERVATIONS ON USE OF RESPIRATORS

If borderline hypoxia (arterial oxyhemoglobin saturations of 94 per cent or less) or progressive carbon dioxide retention, reflected by venous plasma carbon dioxide-combining powers exceeding 70 per cent, could not be overcome by eliminating respiratory obstruction through suction or tracheotomy,[14] artificial respiration was instituted. In patients with relatively slowly progressing poliomyelitis, small degrees of failure of carbon dioxide elimination, with carbon dioxide-combining powers rising to 65 or 70 per cent, occurred as much as 24 to 36 hours before respiratory insufficiency was severe and could be corrected by increasing ventilation for a few hours with a respirator. It was noted that certain patients who initially had difficulty synchronizing with a respirator and were irrational when first placed in one of these devices became rational and more cooperative when their blood carbon dioxide content returned toward normal.

The Rapid Rocking Bed.—The Fast Rocking Bed[15] had both the rate and the depth of its oscillations controlled and was useful in providing rest periods for five acutely ill patients whose unassisted breathing required maximum effort. By intermittently applying the weight of the viscera to the diaphragm at rates up to 24 per minute, and moving through an arc up to 20 degrees from the horizontal, the bed supplemented reduced breathing and helped maintain gas exchange by creating a bellows action on the thorax. It proved inadequate for continuously ventilating patients with drastically paralyzed respiratory musculature during the acute phase of poliomyelitis. In five accutely ill patients it delayed the need for a respirator several hours and enabled them to come out of the respirator sooner. Use of the rocking bed for more than a few hours at a time during the acute illness was limited to a certain extent by the fact that patients sometimes became nauseated and the constant motion interfered with sleep. The rapid rocking bed proved most valuable and was used most extensively during the period of convalescence from poliomyelitis.[11] During this period its action enabled nine patients with severely paralyzed respiratory musculature and vital capacities as low as 200 to 300 cc. to stay outside negative pressure respirators for many hours. The rapid rocking bed was an aid in weaning patients from respirators and enabled them to receive physical therapy and other treatments early in the course of convalescence.

The Cuirass Respirator.—For at least some patients the type of cuirass respirator studied[16] was safe for only brief periods at a time during the acute stage of respiratory insufficiency.[17] Two acutely ill patients were unable to correct severe carbon dioxide retention and acidosis while in this respirator. The carbon dioxide was eventually eliminated by increasing ventilation with a tank type respirator. Spirometer collections on one of these patients, as well as determinations on three convalescent and control subjects, revealed tidal volumes of only 230 to 410 cc., with negative cuirass respirator pressures up to 20 mm. of mercury. The lower volumes were found for the acutely ill subjects. Despite the failure of elimination of carbon dioxide, the arterial oxygenation, at least for a time, remained above 95 per cent in the two acutely ill patients in the cuirass respirator, and this initially obscured the respiratory decompensation.

Autopsies on three patients for whom the cuirass respirator had been used for periods of four to 24 hours preceding death, revealed moderately severe anterior pulmonary emphysema in all.[17] Studies of lung volume, performed during the eighth month of convalescence, on a fourth patient who had been treated in the cuirass respirator for a month during his acute illness, also revealed the presence of moderately severe pulmonary emphysema.[18]

Tank Type Respirators.—These devices[19] accomplished sufficient ventilation in all the patients studied to achieve adequate oxygenation and carbon dioxide elimination. Negative respirator pressures of 15 cm. of water accomplished effective ventilation in most cases, and physiologically effective tidal volumes of 480 to 720 cc. were observed in five patients studied in these respirators. Other investigators, however, have found that positive pressure breathing, synchronous with negative

14. (*a*) Galloway, T. C., and Seifert, M. H.: Bulbar Poliomyelitis: Favorable Results in Its Treatment as Problem in Respiratory Obstruction, J. A. M. A. **141**: 1 (Sept. 3) 1949. (*b*) Brown, J. R., and others: Bulbar Form of Poliomyelitis: II. Therapeutic Measures Based on Pathologic and Physiologic Findings, Minnesota Poliomyelitis Research Commission, J. A. M. A. **135**: 425 (Oct. 18) 1947. (*c*) Priest, R. E.; Boies, L. R., and Boltz, N. F.: Tracheotomy in Bulbar Poliomyelitis, Ann. Otol., Rhin. & Laryng. **56**: 250, 1947.

15. Galloway and Seifert.[14a] Wright, J.: The Respir-Aid Bed in Poliomyelitis, Am. J. Nursing **47**: 454, 1947.

16. The Monaghan Portable Respirator, manufactured by the J. J. Monaghan Company, Denver.

17. Plum, F., and Lukas, D. S.: Respiratory Acidosis in Acute Poliomyelitis: The Effect of a Cuirass Respirator, to be published.

18. Lukas, D. S., and Plum, F.: Pulmonary Function in Patients Convalescing from Acute Poliomyelitis with Respiratory Paralysis, to be published.

19. Manufactured by the J. H. Emerson Company, Cambridge, Mass. and Warren E. Collins, Inc., Boston.

intratank pressures, must be added to the upper airway to achieve adequate ventilation and correct acidosis in some of their patients with respiratory paralysis.[20]

Subsequent observations on lung volume and pulmonary function in eight patients treated with the tank respirator have demonstrated that use of the latter was not associated with the severe degree of pulmonary emphysema found in patients treated with the cuirass type.[18]

The tank type respirator, therefore, was found to be the most satisfactory and the safest device available for combating severe insufficiency of breathing, and when its use is combined with positive pressure breathing the ventilation may be even more effective.

SUMMARY

In cases of acute poliomyelitis with ventilatory failure when vital capacities in adults fell below 1,200 cc., repeated venous plasma carbon dioxide-combining powers and arterial blood oxygen saturations were ascertained. In the absence of obstruction, if the venous plasma carbon dioxide-combining power progressively rose above 60 volumes per cent or the arterial oxyhemoglobin content fell below 94 per cent, the respirator was necessary to restore physiologic respiratory gas exchange.

Failure of carbon dioxide elimination by the lungs and increased levels of carbon dioxide in the blood (hypercapnia) were associated with respiratory paralysis in at least four patients who, as shown by arterial blood gas analysis, had oxyhemoglobin saturations of over 95 per cent. Carbon dioxide retention was reflected by rising venous plasma carbon dioxide-combining power with a normal or acid pH of the blood and acid urine. Accumulation of carbon dioxide in the blood, when not corrected by increasing alveolar ventilation, resulted in blood acidosis, was associated with hypertension and narcosis and may have caused cardiovascular collapse.

The tank type respirator achieved physiologically effective ventilation in patients with severely paralyzed breathing mechanisms. The cuirass type portable respirator could not be relied upon to maintain physiologic respiratory exchange. The rapid rocking bed was useful in supplementing respiratory efforts in patients with limited breathing ability.

ABSTRACT OF DISCUSSION

DR. JOE R. BROWN, Rochester, Minn.: The possibility that the retention of carbon dioxide might be of importance in the care of poliomyelitis was mentioned by Pitt at the International Congress on Poliomyelitis in New York. The reverse of this condition was observed at the University of Minnesota Hospitals in the 1946 epidemic, in which some of the tank type respirators produced excessive ventilation, blowing off excessive carbon dioxide and resulting in chemical changes in the blood which were the reverse of those observed by Drs. Plum and Wolff. It is important, therefore, to know that one is getting the correct amount of respiratory exchange, and not just that one has the respirator turned on at the settings which have been approved by the manufacturers. It would appear that both overventilation and underventilation will produce chemical changes within the blood which are deleterious to the patient. The problem of care of patients with poliomyelitis becomes complicated at times, and one hesitates to make any over-all statement. However, it is possible to clarify some of the observations which may be made. One may see inadequate gaseous exchange associated with deficiency of ventilation or deficiency of the alveoli of the lungs. Deficiencies in ventilation are due to paralysis of the diaphragm or intercostal muscles, depression or destruction of the respiratory center in the medulla or obstruction of the upper airway resulting from pharyngeal or laryngeal paralysis. Alveolar deficiency may be the result of pulmonary edema, atelectasis or pneumonia. Patients have to be watched closely for all these factors, and many factors are interdependent. An example is pulmonary edema caused by an obstructed airway. On the other hand, pulmonary edema itself will further obstruct the airway, producing a vicious cycle. In clinical observation of the patient, it is important first to realize that hypoxia alone will usually produce euphoria. This has been observed repeatedly under various experimental conditions in the air forces. However, retention of carbon dioxide produces a different clinical picture. Retention of smaller amounts of carbon dioxide has a stimulating effect; it produces anxiety, restlessness, fearfulness and, many times, a fear of death. If the patient is able to breathe, there will be an increase in the respiratory rate. As retention of carbon dioxide progresses, a depressant effect occurs, leading to a clouded mental state, delirium and coma. Initially there is an increase in the pulse rate and blood pressure, and finally there will be a state of shock. In many patients with poliomyelitis, retention of carbon dioxide is complicated by inadequate oxygenation. In retention of carbon dioxide the administration of oxygen may lead to temporary apnea. This results from removal of the stimulating effect of hypoxia on the respiratory center in the presence of the sedative effect of carbon dioxide. In subacute retention of carbon dioxide the compensated states occur which have been documented so ably by the authors. With hyperventilation the respiratory center itself will adjust to lower quantities of carbon dioxide in the blood, so that the new levels of carbon dioxide will then become the usual and accustomed levels. When such a patient is taken out of the respirator, he will have difficulty in adjusting because he is now accustomed to lower concentrations of carbon dioxide. It may be that with prolonged retention of carbon dioxide partial readjustment of the respiratory center as well will occur.

DR. ROLAND P. MACKAY, Chicago: This paper illustrates well the role which, ideally, should be played by clinical physiology in sharpening our management of neurological cases. It also emphasizes the extent to which the modern neurologist must acquaint himself with physiologic processes which are not usually considered relevant to clinical neurology. The conclusions of Dr. Plum and Dr. Wolff are illuminating. Elevation of arterial carbon dioxide may be instrumental in keeping the patient in delirium or coma, thus prejudicing his changes for survival at a time when oxygen studies suggest that he is in little respiratory difficulty. Since carbon dioxide is the most powerful stimulant of the respiratory center, its excess in the blood makes certain that a patient with bulbar poliomyelitis, whose respiratory center is already damaged by the disease, will be stimulated far beyond the capacity to respond. This is comparable to requiring a patient with a nearly paralyzed leg to exercise violently during the acute stage of the disease. The authors' experience of the great superiority of the tank respirator over the cuirass type accords with my own. The difficulty with patients with acute respiratory insufficiency is primarily a mechanical one and results from the failure of the diaphragm to perform its function and from the failure of the intercostal muscles of respiration. Therefore, it is certainly inadequate to put such a patient in an oxygen tent or to administer oxygen by any other means. The patient is damaged, actually, by carbon dioxide. In many hospitals, careful studies of the type presented in this paper are not possible, laboratory facilities not being at hand. A few simple clinical points may be of help in the management of the patient. One should remember the old clinical Litten sign for the detection of diaphragmatic excursion. If, in a darkened room, a light falls tangentially along the line of the chest, the excursions of the diaphragm may be observed in the indrawing of intercostal spaces. If the diaphragm is paralyzed, the fact may be detected in this fashion, as well as by the paradoxical infalling of the abdominal wall during inspiration. If a patient's carbon dioxide level is high, he will

20. Bennett, V. R.: Personal communication to the authors.

nearly always show some degree of cyanosis. Therefore close attention to the degree of cyanosis present will be of great help. Even small degrees of cyanosis can readily be detected in the lips and other tissues. On the other hand, if a patient in the tank respirator is hyperventilated, alkalosis may develop. In such cases, cyanosis likewise appears. But in a patient not in a respirator any degree of cyanosis is a danger signal and should call for the use of a respirator.

DR. FRED PLUM, New York: With reference to Dr. Brown's comments on hyperventilation in patients in respirators, I am curious as to whether the hyperventilation he observed was early in the stage of paralysis or later, in the stage of convalescence. Our experience was that hyperventilation was encountered in respirator patients only after they had passed through the acute, prostrating stage of poliomyelitis and were well into convalescence. Mr. Ray Bennett, the respiratory engineer, tells me that this experience was corroborated on a large scale by Dr. Bauer's group in Los Angeles, who encountered fairly severe respiratory acidosis even in patients in tank respirators but did not observe the hyperventilation syndrome except in convalescents. As to the mechanism of action of carbon dioxide on the respiratory center, carbon dioxide is usually used in stimulating amounts of about 5 per cent carbon dioxide to 95 per cent oxygen. If the carbon dioxide concentration is raised to about 10 per cent and the patient or experimental animal continues to breathe this mixture, the respiratory center becomes depressed. A similar phenomenon is present in the patient with pulmonary emphysema, who has chronic carbon dioxide retention. It thus appears that the respiratory center is probably depressed by high carbon dioxide tensions, rather than being exhaustively stimulated by them. In any case, only the carotid bodies provide chemical stimulation of respiration after the respiratory center is gone, and they are stimulated by hypoxemia rather than by high carbon dioxide tensions. The simple tests and the clinical signs which manifest hypoxia and hypercapnia are certainly of the greatest importance. However, we tend to feel that cyanosis cannot be relied on. Dr. Comroe, of Philadelphia, demonstrated the unreliability of cyanosis in the detection of hypoxia. He had a group of clinicians judge patients' arterial oxygen saturations by the degree of cyanosis present and checked these estimations with the oximeter. The correlation was poor, and anoxemia was not consistently manifested by cyanosis until arterial oxygen saturation fell to about 80 per cent. Dr. Brown's co-workers at the University of Minnesota extended studies of this nature to patients with poliomyelitis and by the use of the oximeter demonstrated that the presence or absence of cyanosis was not an accurate index of a patient's oxygenation. The carbon dioxide-consuming power of the blood is simply determined, as is the pH of the urine. Since frequently respiratory decompensation takes 24 to 48 hours to develop, a rising carbon dioxide-combining power and an acid urine would indicate that a patient with respiratory paralysis was not throwing off carbon dioxide and would guide respirator therapy.

ANESTHESIA FOR COMMISSUROTOMY FOR MITRAL STENOSIS

PRELIMINARY REPORT

Kenneth K. Keown, M.D., D. Dwight Grove, M.D.
and
Henry S. Ruth, M.D., Philadelphia

Gibbon,[1] in defining cardiac surgery made the following statements: "Operations upon the human heart have been confined chiefly to the surface or to the walls of the heart. The field of intracardiac surgery on human patients is in its infancy." Because of the increasing employment of intracardiac surgery in human patients, for which our department has been responsible for anesthesia, and because of the increasingly beneficial results obtained by such surgical procedures, it appeared to us that intracardiac surgery held such definite prospects for certain incapacitated patients that its application would increase. Therefore, it was thought that a report on the current methods of anesthetic practices employed by us might be helpful to others who may be called on for this application of anesthesia. This discussion will be limited to anesthesia for commissurotomies in cases of mitral stenosis. Of all surgical procedures on the mitral valve this one has produced the greatest benefit to patients in the hands of our thoracic surgery group.[2] It is possible that intracardiac surgical procedures of other types may be employed more frequently in the future. The current practices of anesthesia may well continue to be satisfactory for all intracardiac operations on adults, but we wish to emphasize that this is a preliminary report. The principles and methods described are the most satisfactory to date for mitral commissurotomies, but we will continue to seek any factor that may show possibilities of increased benefit.

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Read before the Section on Anesthesiology at the Ninety-Ninth Annual Session of the American Medical Association, San Francisco, June 28, 1950.

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2. (*a*) Bailey, C. P.; Glover, R. P., and O'Neill, T. J. E.: The Surgery of Mitral Stenosis, J. Thoracic Surg. **19**: 16-49 (Jan.) 1950. (*b*) Glover, R. P.; O'Neill, T. J. E., and Bailey, C. P.: Commissurotomy for Mitral Stenosis, Circulation **1**: 329-341 (March) 1950.

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PATHOLOGY OF MITRAL STENOSIS

It has been estimated that from 0.5 to 1.0 per cent of the community is affected where rheumatic fever is endemic, and 85 per cent of these by chronic valvular heart disease.[3] This statement provides the reason for the initial investigation of the effects of surgery on the mitral valve (the valve most frequently involved by the disease). Deformity of the mitral valve may result in major stenotic or regurgitant effects. Once these situations arise, the prognosis is unfavorable in almost every instance. Therefore, "desperate measures seem less desperate" when a condition is recognized as having only a fatal or hopeless outlook, and "with application and courage, not infrequently can be made safe." To this end, we believe, anesthesiologists can contribute.

Without an attempt at oversimplification, the basic lesion and subsequent pathological physiology of rheumatic heart disease in which there is deformity of the

mitral valve, as already stated, should perhaps be further explained as follows: There is fibrosis of the mitral valve with or without regurgitation. When this fibrosis becomes well developed, a rigid slit in a fibrotic plaque replaces the normal mitral valve. This pathological change produces increasing back pressure on the left auricle and the pulmonary circuit, with resultant hypertrophy of the right side of the heart. The high pressures produced result in accidents to the pulmonary circulation or failure of the right side of the heart or both.

DEFINITION OF COMMISSUROTOMY

When the usually encountered consequences of mitral disease are considered, it is not surprising that as early as 1902, Brunton,[4] an internist, suggested the possibility of a direct surgical attack on the mitral valve. Digital dilatation of the stenotic mitral valve was performed by Souttar in 1925, with success in one case.[5] At our institution digital dilatation, since termed finger fracturing of the mitral orifice, was performed in three cases, with one success. The first patient was operated on on June 12, 1946 [5a]; death within 72 hours was shown at necropsy to have been caused by clotting at the torn commissures.

Systolic Pressure Within the Auricle During Surgery

Patient	Pressure in Left Auricle, Mm. Hg *	
	Before Commissurotomy	After Commissurotomy
J. B.	45.1/30.3	14.5/2.6
E. W.	35.8/16.5	6.9/1.3
V. S.	30.2/16.0	22.1/7.5
G. B.	45.5/7.8	39.0/6.5

* Pressures recorded by Lilly manometer.

During the postmortem examination, the possibility of cutting the mitral valve commissure into flexible tissues just beyond the fibrotic structures was first considered. This procedure, defined as "commissurotomy" as a result of a suggestion by Durant, is a procedure designed to reestablish a considerable degree of normal valvular function, as compared with procedures substituting regurgitation for stenosis. The method has been adequately described, and the description will not be repeated here. When correctly performed, it relieves the tremendous back pressures resulting from the stenosis, with excellent return of valvular function. As an illustration: By means of cardiac catheterization at the time of the surgical procedure, immediately before cutting of the valve, in one patient the preoperative systolic pressure in millimeters of mercury in the left auricle was reduced by commissurotomy from 45.1 to 14.5, while the diastolic pressure in the left auricle was reduced from 30.3 to 2.6. Fifty patients have been subjected to commissurotomy; eight did not recover.[5a] One patient recovered from the operation and was progressing satisfactorily six months later, when she died as a result of an upper respiratory tract infection and bronchopneumonia.

SELECTION OF CASES

The cases in which a surgical procedure is to be performed are carefully studied and selected. Fluoroscopy is done, electrocardiographic tracings and phonographic recordings are made and circulation time and venous pressures are determined. Catheterization of the right heart and pulmonary artery is important. Patients are studied by a cardiologist, who takes into consideration preoperative pressure readings from the pulmonary arteries and right ventricle and auricle in contemplating

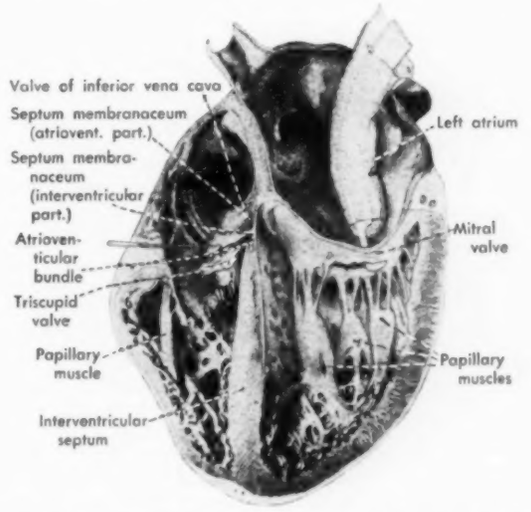

Fig. 1.—Commissurotomy knife on finger, showing method of cutting the mitral valve.

results. Ballistocardiograms and studies of cardiac output also are of value.

We believe that the most favorable group consists of those patients with mitral disease who have excessive fatigability and increasing exertional dyspnea—but no active rheumatic disease—and whose sinus rhythm is normal, in whom the lesion is predominantly stenotic and in whom there is evidence of significantly increased pulmonary hypertension.

A less favorable group, but one for whom surgical intervention is not necessarily contraindicated, consists

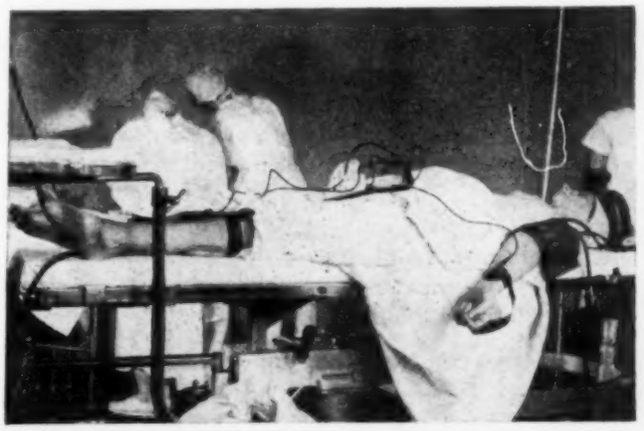

Fig. 2.—Equipment for electrocardiographic tracings in place, patient ready for induction of anesthesia.

of those patients who have the symptoms cited above plus recurrent bouts of hemoptysis arterial embolic phenomena and auricular fibrillation without failure. At

4. Brunton, L.: Preliminary Note on the Possibility of Treating Mitral Stenosis by Surgical Methods, Lancet **1**: 352, 1902.

5. Souttar, H. S.: The Surgical Treatment of Mitral Stenosis, Brit. M. J. **2**: 603-606 (Oct. 3) 1925.

5a. Since this presentation was made, 116 commissurotomies were performed prior to Jan. 1, 1951, with 14 fatalities. From Jan. 1, 1951, to April 1, 1951, 16 were performed with 6 fatalities.

the present time, the presence of auricular fibrillation is not considered a contraindication to the procedure.

Surgical intervention, however, is not instituted in the presence of active rheumatic infections, superimposed subacute bacterial endocarditis, cardiac failure uncontrollable by medical means, or marked associated mitral regurgitation or other valvular (aortic) deformities.[28]

In addition, before a surgical procedure is advised, any previous infarction should be proved to be healed. Patients who are in failure or on the verge of failure are given digitalis both before and after operation. Early in our series of operations it had been customary to employ quinidine sulfate to counteract the irritability of the heart. In one case it appeared to us that there was a synergistic effect between the quinidine sulfate and our method of anesthesiologic care, which so reduced the irritability of the heart that when cardiac arrest occurred cardiac contraction could not be reestablished. Since that one experience, although our department of pharmacology has not been able to duplicate our suspected summation of the effects of quinidine sulfate and procaine, neither quinidine nor any other agent has been employed for that purpose, with the exception of procaine.

PREANESTHETIC PREPARATION

The preanesthetic preparation, medication and anesthesiologic care are directed toward (1) decreasing the irritability of the heart, (2) lessening any factors such as nausea, vomiting, coughing or straining that may be present just before, during or in the immediate postoperative period, because of their effect on increasing pulmonary hypertension with edema, and (3) increasing the already restricted vital capacity of the patient.

PRELIMINARY MEDICATION

Preliminary medication is aimed toward having the patient rested and the metabolic rate as nearly normal as possible without depression. Pentobarbital (nembutal®), 0.10 to 0.20 Gm. (1½ to 3 grains), or secobarbital (seconal®) sodium in the same dosage is prescribed the night before operation. From an hour to an hour and a half before anesthesia, 0.10 Gm. of pentobarbital (1½ grains) is given by mouth, and meperidine (demerol®) hydrochloride, 75 to 150 mg., with atropine sulfate, 0.60 mg., (1/100 grain) are given intramuscularly. Shortly after administration of these drugs a vein in the lower extremities, usually the anterior tibial vein, is cannulated under infiltration anesthesia.

MANAGEMENT OF THE PATIENT IN OPERATING ROOM

After the patient is brought to the operating room, absolute quiet is essential. The equipment for making electrocardiographic tracings and determinations of blood pressure is applied after the patient has been placed in a supine position on the operating room table.

Thirty minutes before induction of anesthesia, a solution of 0.2 per cent procaine in 5 per cent dextrose and distilled water is administered intravenously in the operating room. From 350 to 750 mg. of procaine is given before intubation is carried out. As a result of administration of this combination of drugs, our patients are calm and have received sufficient procaine to obviate the majority of extrinsically caused cardiac irregularities. Usually some slowing of the heart rate can be demonstrated. In addition, procaine, so administered and continued, produces a degree of analgesia beneficial to the patient.

At the time of the preanesthetic examination, and again before anesthesia is induced, an attempt is made to explain the steps of the procedure of which the patient may be aware during operation. This includes the curare-like action of decamethonium bromide (syncurine®). Decamethonium bromide in doses varying from 1 to 4 mg. is administered intravenously until the patient experiences difficulty in opening and closing his eyelids. Thiopental (pentothal®) sodium is then given intravenously in dosages sufficient to produce hypnosis (250 mg. or more). By this time, approximately 350 mg. or more of procaine has been given. A Magill endotracheal catheter is passed under direct vision by the oral route. With this method we have rarely seen a patient "buck" or fight the introduction of an endotracheal tube. A mixture of 50 per cent nitrous oxide and 50 per cent oxygen is administered from the time the patient loses consciousness. During all steps apnea is avoided with its ensuing, although temporary, hypoxia. Whenever indicated, respiratory function is augmented to assure adequate pulmonary ventilation with both adequate oxygen delivery and carbon dioxide elimination. Administration of nitrous oxide and oxygen in this concentration is continued until the left auricular appendage is opened by the surgeon, when 100 per cent oxygen is administered. Procaine is continued at the same concentration of 0.2 per cent, with a basic flow of 1 Gm. per hour. Thiopental sodium is added as required for basal hypnosis. We believe that analgesia and anesthesia result from the combination of procaine, nitrous oxide and thiopental anesthetics.

Fig. 3.—Anesthetized patient ready for draping.

Continuous or semicontinuous electrocardiograms are taken during the surgical procedure. All surgical activities are interrupted if ventricular tachycardias appear, as determined either by electrocardiographic means or directed vision, because we believe that if a ventricular tachycardia is allowed to persist for a longer period than from eight to 10 or slightly more contractions, ventricular fibrillation may occur. With cessation of manipulation, normal cardiac rhythm is usually restored. It is particularly dangerous to overload the cardiovascular system with fluids that easily produce pulmonary edema,

especially in these cases. Solutions of sodium chloride are not employed because of their well known effect in this respect, as well as the possibility of oliguria occurring after operations. Whole blood is administered as indicated. From the viewpoint of anesthesiology, we whole-heartedly advocate the physiological rectification of hypotension brought about by shock, in contradistinction to pharmacologic treatment of the condition by means of drugs. Usually but little blood is lost, because of the present perfection of surgical technic.

At the completion of intracardiac manipulation, the rate of flow of procaine is decreased. Usually thiopental sodium need not be added after the approximation of the chest wall has been started. We attempt to have these patients awake, moving and responsive at the completion of surgery.

We have been alarmed by symptoms produced by a change of position, such as elevation of a shoulder, during the operative procedure. In such cases the heart could conceivably be further dislocated once the procedure is initiated. For this reason, we attempt to avoid any change of position once the pericardium has been opened.

POSTANESTHETIC MANAGEMENT

Immediately after operation, a thorough tracheobronchial toilet is performed, and if superficial reflexes have returned, as is the usual experience, extubation is carried out. If the blood pressure and pulse rate are stable, the venous cannula is removed in order to avoid a temptation to administer excessive intravenous fluids. If pulmonary edema is present, oxygen under positive pressure is administered until there is no further evidence of this complication. Administration of oxygen is continued by means of nasal catheter for varying periods. A limited fluid intake is prescribed. Sedative drugs may be given, but depressants should be avoided. The patient is usually ambulatory in from three to five days.

SUMMARY

A preliminary report on the anesthesiologic management of 50 cases of mitral commissurotomy is presented.

ABSTRACT OF DISCUSSION

Dr. Lloyd H. Mousel, Seattle: Dr. Ruth and his associates have had an exceptional opportunity in the development of anesthetic methods for this new intracardiac surgical procedure. Dr. William Derrick at the Peter Bent Brigham Hospital has had the opportunity of anesthetizing a substantial group of patients for mitral valvuloplasty. All patients in his group were considered exceedingly poor risks, many of them having been entirely bedfast for periods of six months to four years prior to operation, and many of them having had acute bouts of cardiac failure and pulmonary edema. Derrick states that the development of preoperative tachycardia has given them great concern. In several patients tachycardia and pulmonary edema, due probably to increased pulmonary hypertension, developed on the day before operation had been scheduled. He attributed this condition to the apprehension in the patient. Following their early experience of having to postpone surgical intervention because of right heart failure, he has "stolen" the patient by the intravenous administration of thiopental (pentothal®) sodium, given in the patient's room. Following the thiopental injection, ether has been used as the main anesthetic agent. One patient was anesthetized successfully with ethylene and oxygen. Derrick has not used the intravenous administration of procaine routinely, withholding it for use in 20 to 40 mg. doses in those cases where cardiac arrhythmias are noted on the continuous electrocardiographic tracings. In all of his patients the pericardial sac has been flooded with a 1 per cent solution of procaine as soon as it has been opened. No mention has been made, in either Derrick's or Ruth's report, of myocardial infiltration. This procedure was first used by Horace Smithy, and later by Blades, Blalock, Bailey and others. Apparently the myocardium can be infiltrated safely prior to the placement of a purse-string suture around the area to be incised. Local anesthesia in this area tends to prevent arrhythmias from extrinsic stimulation. A 1 or 2 per cent procaine solution is not of adequate strength to reduce myocardial irritability. I would recommend that a 5 per cent solution be used in the pericardium, and that the heart be allowed to swim in this solution for several minutes before the incision is made in the auricular appendage. In patients with mitral stenosis pulmonary hypertension develops. If intrapulmonic pressures are increased above the patient's compensated level, right heart failure may be expected. This possibility should be borne in mind in all anesthetic management. Working with dogs, Pierpont, Blades and I found that controlled and supported respiration increased pressures within the pulmonary arteries and right ventricle greatly above normal levels. It seems possible that controlled respiration or too vigorous supported respiration in patients with mitral stenosis might increase pulmonary hypertension to such an extent that right heart failure with pulmonary edema could develop in a short period of time. The same condition might result from the application of positive pressure oxygen or air in an attempt to treat pulmonary edema in patients who have pulmonary hypertension. We know too little regarding the hemodynamics of pulmonary and cardiac circulation during our positive pressure and controlled respiratory manipulations. A great amount of research in the physiology of circulation needs to be done soon, in order that our anesthesia improvements can keep pace with the newer developments in intracardiac surgery.

Dr. W. O. McQuiston, Peoria, Ill.: The results reported by Dr. Ruth and his associates are spectacular. The patients in this series could by no stretch of the imagination be considered even fair anesthetic risks. Commissurotomy in the adult is a much more difficult and dangerous procedure than commissurotomy or valvulotomy in the child, just as division of a patent ductus or excision of a coarctation of the aorta in the adult is a much more formidable procedure than the same operation in the child. Since I have had no experience with intracardiac surgery in the adult, it would be presumptuous, and possibly dangerous, to suggest that the relatively simple anesthetic technique that we have used successfully for intracardiac surgery in children might also be adequate for the adult. However, in children, at least, other agents and techniques may be used. We attempt to reduce the metabolism without respiratory depression, by administering relatively large doses of morphine and scopolamine or atropine preoperatively. Morphine has always been our favorite sedative drug for cardiac patients, and we wonder if Dr. Ruth uses meperidine (demerol®) hydrochloride for intracardiac surgery because of its spasmolytic action, and if he prefers it to morphine for all types of cardiac patients. We have used cyclopropane for all our intracardiac surgery as well as for exploration inside the pericardium. After the pericardial sac is opened, 1 per cent solution of procaine is poured into the sac, bathing the heart with procaine for at least five minutes before the heart is opened or handled. Arryhthmia has not been noted. By means of this technique four patients—23 days, 2 months, 11 months, and 10 years of age—have undergone pulmonary vavulotomy with no mortality, and several children have undergone extensive intrapericardial explorations. Adequate pulmonary ventilation with an atmosphere rich in oxygen has been stressed by Dr. Ruth. After experience with over 500 patients undergoing cardiac surgery, it is my clinical impression that oxygenation is the most important factor in preventing cardiac disturbances. We feel that unassisted or occasionally assisted respiration when the chest is opened may result in inadequate pulmonary ventilation, and we therefore use controlled respiration on all patients. The danger of overloading the cardiovascular system with fluids cannot be overemphasized. With too much fluids pulmonary edema and/or

cardiac decompensation may occur. We administer a 50 per cent dextrose solution intravenously if edema occurs, and digitalize the patient with one of the drugs for intravenous administration if cardiac decompensation occurs.

DR. HENRY S. RUTH, Philadelphia: Emphasis should be placed on the fact that we not only have used the method presented to you, which is the method of anesthesia management we employ at the present time, but have also employed ethyl ether, cyclopropane and other drugs. In our hands, at least, these agents did not provide as satisfactory results. Instillations of the higher percentages of procaine in the pericardium after it has been opened and after the injection of the auricular appendage, were not called to your attention because they are performed by the surgeon, and limitations of time prevented us from discussing any portion of the surgical management in great detail. I do not believe that Dr. Mousel's criticism of oxygen administered under pressure applies to our use of it in the manner reported. If you will recall, oxygen under pressure for the treatment of pulmonary edema was listed under postanesthesiological care. It is to be remembered, too, that the pressure in the pulmonary circuit is relieved by commissurotomy. Therefore, no greater precautions in the utilization of oxygen under pressure appear to be indicated here than elsewhere. Lastly, to answer a question by Dr. McQuiston: We are using meperidine (demerol®) hydrochloride for spasmolytic effect, and, also, because we believe less nausea and vomiting follow its use. Any bouts of postoperative nausea and vomiting are, of course, not well tolerated in these patients.

HYPERTHYROIDISM WITHOUT APPARENT HYPERMETABOLISM

Sidney C. Werner, M.D.
and
Howard Hamilton, M.D., New York

A recent study in this clinic of the newer laboratory technics for appraising thyroid function [1] has revealed several points of interest. First, the evaluation of a single function of the gland, such as the ability to take up radioiodine [2] or to maintain the level of precipitable iodine in the serum,[3] does not always reflect the over-all activity of the gland. Second, the appraisal of several functions of the thyroid has not overcome this difficulty. The determination of the levels of both radioiodine tracer uptake and serum precipitable iodine chemically, or of tracer uptake and basal metabolic rate, provides, with about 95 per cent accuracy, a reflection of gland activity, but it is still not pathognomonic of either hyperthyroidism or hypothyroidism. Third, despite this limitation, the use of the newer technics has permitted the characterization of a hitherto poorly recognized group of patients who have hyperthyroidism but no apparent concurrent elevation of basal metabolic rate.

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An analysis of the data from 15 such patients seen at the Presbyterian Hospital in the past year is the subject of the present report. There are several of the 15 patients in whom the clinical picture was induced during radioiodine therapy for hyperthyroidism.[4] As a consequence, we had considerable difficulty in establishing whether control over toxicity was in part or was entirely achieved.

The concept that hyperthyroidism may occur without ostensible hypermetabolism has received sporadic attention in the literature.[5] However, these papers have not won acceptance of the entity by all clinics. The well known difficulties in clinical differentiation between hyperthyroidism and anxiety or other psychoneurotic states [5e] has made for skepticism toward a diagnosis, which has to be made in the face of lack of support from the laboratory. Swenson and Curtis [6] most recently have been interested in the problem. They studied diffuse and nodular goiter and noted a group of patients with normal basal metabolic rates, but with elevation of the serum iodine level. They postulated that these patients might have toxicity from goiter. Soisalo, however, in a similar series could not entirely concur with this interpretation on the basis of a more detailed iodine tolerance test.[7] Moreover, the relatively high incidence of elevated values of serum iodine in euthyroid subjects proved not to have hyperthyroidism [8] makes difficult the acceptance of this test as a final diagnostic criterion for the individual patient.

In order to avoid question, a definite response to therapy has been required in the present study, in addition to laboratory evidence from the radioiodine tracer, serum precipitable iodine and basal metabolic rate determinations, before a final diagnosis of hyperthyroidism without apparent hypermetabolism has been accepted.

METHODS

All patients were seen either in the hospital or in the thyroid clinic by one of us (S. C. W.). Adequate follow-up has been possible after initiation of therapy in all but one patient. This patient's data have been included in the tables since there is little doubt as to the correctness of the diagnosis.

Customary clinical and laboratory procedures have been employed to establish a diagnosis and evaluate the results of treatment. Basal metabolic rate determinations were performed in the routine basal metabolism laboratory with the use of a Benedict-Roth apparatus. Two or three readings of five minutes each were made after the usual 30 minutes of bed rest. Spirograms were reviewed and considered satisfactory in all patients listed except one with a habit spasm, champing of the jaws.

TABLE 1.—*Previous Treatment for Hyperthyroidism*

Therapy	Group 1	Group 2
No previous treatment	6	1
Chronic antithyroid drug	2	1
Operation	2	0
Radioiodine	4*	0
Roentgen	1	0

* Of the four patients under radioiodine therapy, one had not been operated on previously, and three had had recurrence of hyperthyroidism after operation.

TABLE 2.—*Initial Symptoms*

Symptom	Group 1		Group 2	
	No. Positive	No. Tested	No. Positive	No. Tested
Weight loss	11	15	1	2
Nervousness	11	15	1	2
Fatigability	8	14	2	2
Palpitation	8	13	0	1
Sweating, heat sensitivity	4	11	0	1
Diarrhea	2	7	0	1
Eyes	0	15	0	2

The uptake of radioiodine was measured directly over the gland 24 hours after the ingestion of 40 microcuries of I^{131}, as previously described.[9] The chemical determination of precipitable iodine in the serum was done by the method of Barker.[3c] The determination of serum cholesterol was done with the patient in the fasting state by the method of Bloor.[10] The inherent inaccuracy of the method is recognized, but experience indicates that rising levels usually represent clinical improvement.

TABLE 3.—*Initial Physical Signs*

Physical Sign	Group 1		Group 2	
	No. Positive	No. Tested	No. Positive	No. Tested
Pulse rate *	15	15	2	2
Tremor	8	13	1	2
Coarse	4	..	0	..
Fine	4	..	1	..
Palms "hothouse"	8	14	1	2
Thyroid enlargement	10	15	1	2
0	5	..	1	..
+	5	..	1	..
++	3	..	0	..
+++	2	..	0	..
++++	0	..	0	..
Exophthalmos	0	15	0	2

* Pulse rate in group 1 ranged from 86 to 120 per minute. Pulse rate in group 2 was 100.

The result of a trial period of administration of a sedative or sodium iodide was observed in several instances for confirmation of the clinical impression. Definitive therapy was undertaken with radioiodine in six instances, propylthiouracil in five and surgical intervention in one. Sodium iodide alone was given in two. No treatment was possible in the one patient lost to follow-up. Of the two patients thought not to have hyperthyroidism, one received roentgen therapy, and the other antithyroid drug in the same dosage as the other patients. There was no response in either instance.

RESULTS

Clinical Observations.—The history and physical examination of each of the 15 patients considered to have hyperthyroidism (group 1) has been analyzed (tables 1, 2 and 3). There are 13 women and two men, whose ages range from 21 to 61 years. Two additional patients thought not to have toxic goiter because of lack of response to therapy (group 2) are included in the tables to emphasize the inherent error in reliance on laboratory findings alone. Their ages were 34 and 63 years, respectively.

A clinical suspicion of hyperthyroidism was present in almost every instance prior to investigation. Nevertheless, the symptom picture was equally consistent with the manifestations of a neurosis, such as anxiety state or neurocirculatory asthenia. As a result, there was generally no uniformity of opinion as to the diagnosis among the several experienced clinicians first seeing a given patient before the reports from the laboratory were received. The most consistent symptoms elicited in the history (table 2) were nervousness in 11 of the 15 patients, weight loss with good appetite in 10, palpitations and fatigability in eight each.

TABLE 4.—*Response of Body Weight to Treatment*

Group	Weight Gain	
	Average, Lbs.	Range, Lbs.
1	7	3-14
2	+1, −1	+1 −1

The one consistent finding on physical examination (table 3) was tachycardia, noted in all 15 patients, with pulse rates between 86 and 120 per minute. Warm moist palms were noted in eight. A readily palpable gland was observed in five patients. The gland was barely palpable in five and was impalpable in the other five. Tremor of the extended hands was present in nine patients, fine in character in five of these and coarse in the other four. No tremor was apparent in four, while the observation was not made in one. Weight gain (table 4) and subsidence of symptoms and signs were noted in response to treatment in all the patients diagnosed as having hyperthy-

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7. Soisalo, P.: Blood Iodine and Thyroid Function: A Study of 254 Cases, Acta med. Scandinav. **133**: 186, 1949.

8. Salter, Karandikar and Block.[3a] Connor, Curtis and Swenson.[3c]

9. Werner, S. C.; Quimby, E. H., and Schmidt, C.: Clinical Experience in Diagnosis and Treatment of Thyroid Disorders with Radioactive Iodine (Eight Day Half-Life), Radiology **51**: 564, 1948.

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roidism except in the one patient not adequately followed, of whom proper observation was not possible.

Laboratory Findings.—The levels of tracer uptake and serum precipitable iodine chemically are abnormally high in the patients presented in this report, since this has been a requirement for diagnosis (table 5). The results of the basal metabolic rate determination before definitive treatment range from + 1 per cent to + 16 per cent, with an average of + 11 per cent.

There is only one basal metabolic rate value of + 16 per cent; nine of the remaining fall between + 10 per cent and + 15 per cent and five between ± 0 per cent and + 10 per cent. The selection of + 15 per cent as the upper limit of normal for the basal metabolic rate is based on the fact that in this laboratory, approximately 25 per cent of concurrently tested and proved euthyroid patients have basal values in excess of + 10 per cent and about 15 per cent in excess of + 15 per cent.[1] Thus distinction between thyroid overactivity and anxiety or hypertension on the basis of a basal metabolic rate determination in the + 10 per cent to + 15 per cent range is virtually impossible from this evidence alone.

The highest level of radioiodine tracer uptake for the hyperthyroid group presented herein is 77 per cent uptake at 24 hours. There are nine uptake values greater than 50 per cent at 24 hours, five values between 40 and 49 per cent and one value of 38 per cent. Over-all experience with the method reveals practically no incidence of uptake greater than 50 per cent at 24 hours in euthyroid subjects, although 10 per cent of patients without known thyroid disturbance take up 40-50 per cent of the tracer dose at 24 hours.[1]

Serum precipitable iodine levels in the hyperthyroid group range between 8.4 and 25.9 gamma per 100 cc. The average for the series before treatment is 13.1 gamma per 100 cc. The upper limit of normal for the method is considered as 8 gamma per 100 cc. It is generally agreed that about 5-10 per cent of serum iodine values may exceed 8 gamma per 100 cc. in apparently euthyroid subjects, often by a considerable margin.

The values for fasting serum cholesterol are listed in table 5. There is no definite trend indicated by the results. The normal range by the method used is approximately 150-250 mg. per 100 cc.

Treatment of hyperthyroidism in these patients is followed by a definite fall in basal metabolic rate, a return of the serum precipitable iodine level toward normal and a slight rise in serum cholesterol. The correlation between tracer uptake and hormone release may be disrupted by therapy [2c] so that this test was not followed after treatment.

COMMENT

The concept that hyperthyroidism may exist without apparent elevation of basal metabolic rate appears to have been confirmed. This statement applies to the basal rate determination as done routinely in the laboratory and has not been subjected to verification by special technics. These persons mainly have been classified in the past as neurotic or hypertensive on the basis of the relatively normal result of the basal metabolic rate determination. The introduction of the radioiodine tracer test has made it relatively simple to screen out for further study [11] those patients with elevated uptake. Confirmation of possible hyperthyroidism should then be sought by the serum precipitable iodine and basal metabolic rate determinations. However, even with support from the laboratory data, it must be emphasized again that further documentation of the possibility of toxicity from goiter must be found in a favorable result from therapy before the diagnosis can be said to be complete.

There is real danger that innumerable patients with neuroses, anxiety state, hypertensive disease or some extraneous disorder may be treated for hyperthyroidism if reliance is not placed on all these criteria. In case of doubt as to the ultimate result to be expected from treatment, information frequently may be gained by the administration of sodium iodide for a two week period.[12] A favorable response to the drug is indicated by weight gain, by amelioration of toxicity and often by some decrease in basal metabolic rate. Serum precipitable iodine values tend to decrease under the influence of sodium iodide. A return of toxicity should follow discontinuance of sodium iodide.

The production of hyperthyroidism without elevation of basal metabolic rate after incompletely successful radioiodine therapy of toxic goiter (table 1) is of interest in terms of the mechanism of action of radioiodine. It appears likely that a quantitative reduction of functional thyroid tissue accounts for the remission induced by this treatment, rather than that a physiopathologic process is interrupted. It is also apparent that the clinician must be alert to the possibility of this type of borderline toxicity when control over toxicity is not quite complete after forms of therapy for hyperthyroidism other than radioiodine. A basal metabolic rate between ± 0 per cent and

TABLE 5.—*Laboratory Values Before and After Treatment*

	BMR, %		Cholesterol, Mg. 100 Cc.		Radioiodine Uptake, % at 24 Hr.		S.P.I., Gamma 100 Cc.	
	Before	After	Before	After	Before	After	Before	After
Group 1								
Average	+ 11	6	176	234	55	..	13.1	7.2
Range	+ 1-+ 16	− 18-+ 8	111-249	181-371	38-77	..	9.3-25.9	5.6-8.9
Group 2*								
Range	− 20-± 0	− 18-+ 3	153-199	238	60	30	9.3- 9.8	...

11. Werner, S. C.; Goodwin, L. D., and Quimby, E. H.: The Tracer Technique with Radioiodine, I^{131}, as a Potential Substitute for the Basal Metabolic Rate Determination in Routine Clinical Practice, abstracted, J. Clin. Endocrinol. **9**: 664, 1949. Werner, S. C.; Quimby, E. H.; Goodwin, L. C., and Schmidt, C.: Some Results from the Use of Radioiodine, I^{131}, in the Diagnosis and Treatment of Toxic Goiter, Am. J. Roentgenol. **63**: 889, 1950.

12. Means, J. H.: The Thyroid and Its Diseases, ed. 2, Philadelphia, J. B. Lippincott Company, 1948, p. 378.

+15 per cent cannot be relied on too heavily as an indication that complete remission from toxicity has been obtained.

SUMMARY

Hyperthyroidism without apparent hypermetabolism has been observed in 15 patients at the Presbyterian Hospital within the past year. It has been required for the diagnosis that the values for both radioiodine uptake and serum precipitable iodine chemically determined be elevated and that there be a satisfactory response to therapy subsequently. It is stressed that these rigid criteria must be maintained if needless treatment of countless neurotic and hypertensive patients is to be avoided. The clinical picture and laboratory findings in this group are summarized. Two additional patients are reported with laboratory findings consistent with the diagnosis of hyperthyroidism but with lack of response to treatment.

ABSTRACT OF DISCUSSION

DR. M. PAUL STARR, Pasadena, Calif.: It is no surprise to me that this excellent paper by Dr. Werner points out that there are some persons with hyperthyroidism who have a basal metabolism within the normal range. With regard to the rate of uptake of radioactive iodine, which I also have studied, I think that it measures the activity of the thyroid gland in its relation to the metabolism of iodine and does not have much to do with whether or not the patient has hyperthyroidism. From the experiences I have had in being consulted with regard to radioactive iodine, I would like to have the profession realize that it is no more pathognomonic or diagnostic than other laboratory methods; in fact, the uptake, I feel, is rather unreliable as a diagnostic procedure. The basal metabolic rate test is unreliable because it is nonspecific, since it measures the total oxygen found in the body, which is influenced by many things that are not directly dependent on the thyroid hormone. On the other hand, it seems to me that the protein-bound iodine, which measures the level of the thyroid hormone in the blood, is the most reliable diagnostic method. One trouble in this whole discussion is that none of us is clear about what hyperthyroidism is, and since we cannot define what we mean by the disease, it is a little hard to decide what is the best diagnostic test for the disease. In one sense, we are studying the thyroid too much; whereas we should think of the disease as a failure of homeostasis. Dr. Means suggested this several years ago. The condition we are thinking of as Graves' disease or hyperthyroidism is a failure in some response to stress. We all have stresses. The patient with hyperthyroidism, however, cannot get back to normal. The patient's history and complaints are a poor guide to whether or not he has the disease. Dr. Mayo Soley laid down a dictum sometime ago which I think was to the point, i. e., that many patients with hyperthyroidism cannot tell you whether or not they have hyperthyroidism until they have been relieved of the hyperthyroidism; in other words, they have to return to a euthyroid state and homeostasis must be restored before they can think properly about their previous condition and then realize that they were sick. In our hands, the use of the chemical measurement of the protein-bound blood iodine is the most reliable method of diagnosis of hyperthyroidism. I would like to emphasize the chemical determination of the disease in this case just as one uses the chemical determination in diabetes. The experience in the Diabetic Association throughout the country has been that there are many people who have diabetes without knowing that they have it, but that it is demonstrated by the chemical determination of excess sugar. I believe that the same thing is true of hyperthyroidism with relation to excess thyroid hormone iodine.

DR. EDWARD D. ROBBINS, Chicago: Ever since the introduction of clinical calorimetry, there has been a regrettable tendency to identify the basal metabolic rate more or less exactly with the function of the thyroid. But it is known that this gland contributes at most 40 per cent to the total basal metabolic rate, that many morbid processes other than thyroid disease affect the basal metabolic rate and that the basal metabolic rate may deviate considerably from so-called "normal" without thyroid dysfunction being present. Hyperthyroidism, hypermetabolism, hypometabolism and perhaps even hypothyroidism may exist as independent variables. It is common knowledge that a large number of nonmetabolic diseases, e. g., pheochromocytoma and leukemia, may produce states of hypermetabolism without hyperthyroidism. Drs. Werner and Hamilton have described cases of hyperthyroidism without hypermetabolism. There is excellent evidence that most patients with low basal metabolic rates but without myxedema have hypometabolism but not hypothyroidism. Further, many patients with undernutrition and anorexia nervosa have low basal metabolic rates without hypofunction of the thyroid. There may be one rather obvious explanation for the six cases in this report that had no previous treatment. The normal distribution curve for the basal metabolic determinations on patients without metabolic disease is a gaussian one, and while 95 per cent of patients fall between —18 per cent and +22 per cent, 2½ per cent of these patients have basal metabolic rates below —18 per cent. When a euthyroid person whose basal metabolic rate is normally —20 per cent develops hyperfunction of the thyroid gland sufficient to raise his basal metabolic rate 30 points, it is then +10, which is still within the so-called "normal" range. There are some reservations which must be borne in mind when one interprets data from thyroid uptake studies with I^{131}: First, Salter has emphasized that to measure the turnover rate of iodide to hormonal iodine, which is what we are really interested in, one must make simultaneous measurements of isotope and stable element. Second, when one measures the total isotope content by an external counter, one measures the avidity of the gland for iodine, but not the turnover rate of iodide to hormonal iodine. It is possible that cases of high isotope uptake after partial destruction of the gland by radioiodine or subtotal thyroidectomy are caused by hyperplasia of the remnant of the gland and/or or by decrease in total body iodine which results from loss of part of the thyroid gland with its stored iodine.

DR. EARLE M. CHAPMAN, Boston: As a member of Dr. Mean's clinic, I want to say that we have seen recent cases of this kind. We recently studied two such cases thoroughly for comparative data. One of these women was treated for what was called rheumatoid arthritis for a period of two years, and we presented her in our clinic, where it was agreed she was not thyrotoxic and yet her uptake of radioiodine was 90 per cent and her protein-bound iodine was up about 12 to 13 micrograms. We have not yet undertaken therapy with her. We had another similar case, and in all, I think we will be able to collect about eight or 10 such cases now in our clinic.

The Quality of Medical Care.—In these stormy and controversial days, much is being said about problems, real or imagined, in the general area of medicine as they relate themselves to society at large. Particularly do we hear about difficulties in the quantity and distribution of medical care, and in the economic mechanism of the provision of adequate medical care. The factors of quantity and economics have tended to obscure far too often the basic fact that the existence of medical care and the ability to buy it are essentially in vain if the care is not of the highest quality. The research laboratories have put into the hands of the practitioners of medicine in all fields, tools which are in a sense double-edged swords. When applied with skill to a medical problem, these tools can be of enormous diagnostic and therapeutic good. When applied carelessly and without complete knowledge, these tools may reap havoc. Therefore, it is incumbent on everyone who concerns himself with medicine increasingly to orient his actions and thinking toward programs designed to deliver to the American people not only adequate amounts of medical care at a price which the people can pay but, perhaps above all else, medical care of the very highest quality.—Franklin D. Murphy, M.D., Postgraduate Education with Reference to Anesthesia, *Anesthesiology*, January 1951.

NASOPHARYNGEAL IRRADIATION

RELATIVE MERITS OF ROENTGEN AND RADIUM THERAPY FOR BENIGN CONDITIONS

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and
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For many years irradiation has proved to be of considerable benefit in cases of hyperplasia of the lymphoid tissue in the nasopharynx. What are the actual results of treatment in clinical practice? What is the most effective method of irradiation? In an attempt to answer these questions we have reviewed our results in several hundred cases and have summarized the relative physical effectiveness of the two commonly applied methods of irradiation.

ANATOMIC CONSIDERATIONS

In adults the eustachian tubes are about 3.6 cm. in length and the orifices usually 4 cm. apart. The bony portion of the eustachian tube comprises the outer third; it joins the cartilaginous portion at the isthmus, or narrowest part of the tube. The size of the tube increases as it reaches its pharyngeal end. Normally the walls in its mesial half are apposed; its ostium is vertical and slitlike except when forced open by muscular action or positive

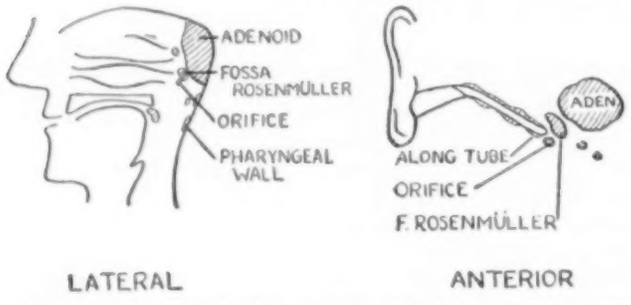

Fig. 1.—Diagrams showing location of pathological changes in benign nasopharyngeal lymphoid hyperplasia. Note the location of shaded areas of hyperplastic lymphoid tissue, especially those along each eustachian tube; the latter deposits develop with repeated or chronic infection.

pressure. The nasopharyngeal orifices of the tubes are surrounded above and behind by the torus tubarius, a prominent bulge composed of cartilage covered by mucosa. Above and behind the torus, is the fossa of Rosenmüller, which is lined with lymph follicles and lymphoid tissue. On the roof and upper posterior wall of the nasopharynx lies the adenoid. Although there is one central area of attachment, it may be very extensive and extend into the fossa of Rosenmüller and even over the torus tubarius. There is no well defined tissue or capsule separating the adenoid from the superior constrictor muscle.

Scattered superficial bands of lymphoid tissue lie on the posterior and lateral walls of the pharynx and nasopharynx. Both the lateral bands and the scattered nodules are more developed in the upper part of the nasopharynx and less developed inferiorly. This tissue is normally about 2 mm. thick. Farrior,[1] Wolff, Teutleben and Zollner have shown that lymphoid tissue is absent in and about normal tubes. In the presence of acute and chronic infection lymphoid tissue may occure anywhere along the tube and even in the middle ear. The lymphoid tissue is most prominent at the pharyngeal end of each tube, where it is sometimes called the tubal, or Gerlach's, tonsil. The mucous membrane lining of the tympanic cavities and eustachian tubes is continuous with that of the nasopharynx. The pharyngeal ostium acts as a flutter valve, allowing escape of air under pressure from the middle ear but preventing passage of air into the middle ear.

PATHOLOGIC CONSIDERATIONS

The lymphoid tissue comprising Waldeyer's ring is normally "thick" or "hypertrophic" in childhood. About the time of puberty it begins to atrophy, except in cases of infection, when it persists with or without scar tissue formation. With repeated infections, adhesions may form from the adenoids to the torus. The close association of this lymphatic tissue to the nose, sinuses and eustachian tubes seems to be a factor in frequent infection.

The normal air exchange between the middle ear and the nasopharynx is extremely slow. The normal tube does not open with each act of swallowing and may remain closed for long periods of time each day. With edema or hyperplasia of the lymphoid tissue in the eustachian tubes or around their orifices there is blockage, which, if prolonged, leads to changes in the middle ear. Deafness may result by mechanical block or compression of the pharyngeal end of the tube (fig. 1).

In chronic or repeated infections there are hypertrophy of the lymphoid tissue and inflammatory changes that may apparently act as a focus of infection for subsequent development of sinusitis or otitis. Patients may show a granular pharyngitis or mucus hypersecretion. Aviators with lymphoid hyperplasia may get on well until a cold develops with consequent edema of the lymphoid tissue and excess mucus formation; this blocks the eustachian tube, leading to aero-otitis.

There are various stages of aero-otitis, and if the air pressure is increasing, the pressure in the middle ear and nasopharynx must be equalized and the tube opened by means of its muscles, or a definite sequence of events follows. With a difference of 3 to 5 mm. pressure of mercury (at sea level) "fulness" develops in the ears; at 15 to 30 mm. there are discomfort and diminished hearing; above 30 mm. there may be pain, tinnitus, bleeding, vertigo and nausea; at 80 to 90 mm., great pain and exacerbation of all the other findings. When the air pressure in the tube is greatly decreased the veins in its wall will expand and may rupture, with blood and serum filling the middle ear.[2]

Once fluid has formed, its complete replacement by air takes about two weeks even when normal tubal function is maintained. Prolonged tubal obstruction, with or with-

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1. Farrior, J. B.: Histopathological Considerations in Treatment of the Eustachian Tube, Arch. Otolaryng. **37**: 609 (May) 1943.

2. Shilling, C. W., and others: Prevention and Treatment of Aerotitis Media, U. S. Nav. M. Bull. **46**: 1529 (Oct.) 1946.

out exudative catarrh, may produce temporary or irreversible changes in the conduction mechanism. As Crowe [3] and others have pointed out, it is not alone the presence of the lymphoid tissue in the nasopharynx but also its localization at or near the tubal orifices that is important in deafness.

After infection, the torus tubarius shows marked inflammatory changes, particularly around the anterior lip where the mucosa is not bound firmly to the underlying structures. The inflammation may obliterate the orifice completely. Adenoid tissue may reach obstructive proportions. The posterior tips of the inferior turbinates are frequently edematous and show polypoid changes, and although they do not influence the tubes per se, they indicate associated inflammatory conditions. Since there is no clinical means of determining the presence or absence of lymphoid infiltration of the tubal wall beyond the torus, one may reasonably infer its presence when there is generalized lymphoid infiltration of the pharyngeal walls, torus and fossae. Farrior has illustrated the detailed histopathological changes of chronic infection.[1]

SYMPTOMATOLOGY

This brief review of pathological changes presages the wide variety of clinical findings one may encounter in these patients. There may be diffuse inflammation or thickening of the mucous membrane, with excess mucous discharge and postnasal drip. The patients have frequent colds, sore throats, sinusitis and catarrhal otitis; the crypts in the lymphoid tissue are said to be favorable locations for the common cold virus and the bacteria of upper respiratory tract infections. There are stuffiness and fulness in the ears and nose. Buzzing and roaring in the ears are common. There may be intermittent deafness, often improved in the summer months. Progressive deafness, beginning with the highest tones (above 8,000 double vibrations) may develop in patients with chronic eustachian tube block. During World War II aero-otitis (or barotrauma) was of considerable import among Air Force and submarine personnel.[4] Aero-otitis is characterized by middle ear lesions caused by failure to equalize pressure between the middle ear and the surrounding atmosphere. Effects of altitude on the middle ear have long been recognized but recently have been of greater concern because of increased commercial and military aviation. Patients suffering from this condition have otalgia, fulness in the ears, tinnitus and recurrent discharge. The pain in some cases is reported to be so great that there are associated vertigo, nausea and vomiting. The drum may be hemorrhagic and retracted and in severe cases may rupture. With a less severe process, there is reddening along the handle of the malleus and the periphery of the drum, as in beginning otitis. With relatively negative pressure due to oxygen absorption, a transudative fluid appears in the middle ear (serous catarrh) or there is gross bleeding.

TREATMENT

The treatment of choice in hyperplasia of the lymphoid tissue is radiation therapy, since this hyperplastic tissue is not amenable to surgery. This therapy can be applied either by external or intraoral use of roentgen rays or by local nasopharyngeal application of radium. Jarvis, in 1923, first reported on the use of nasopharyngeal roentgen therapy for patients with congested ears. Crowe has been using radium or radon applicators for lymphoid hyperplasia since 1924, and during the recent war radium was used extensively in the medical departments of the Air Force and Navy.

Radium Therapy.—The radium applications are carried out after local anesthesia. The holder is inserted along the floor of the nose to the region of the eustachian tube orifice, so that the radium centers on the orifice and does not enter it. There are a number of different types of holders [5] for the radium, and the one now in common use is made of monel metal, with a wall thickness of 0.3 mm. monel. The active length is 15 mm. and the outside diameter 2.3 mm. Each holder contains 50 mg. of radium. The holders are usually left in place 12 minutes, giving 600 mg. minutes of radiation to each side. This container gives beta as well as gamma rays (fig. 2).

Measurement of the precise amount of radiation emanating from the radium applicator is difficult, and different sets of figures are obtained from the literature. Fowler [6] and Quimby give the roentgens obtained with

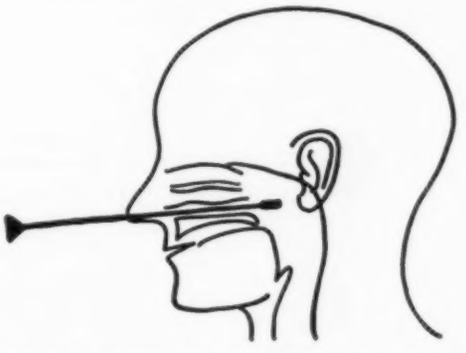

Fig. 2.—Diagram showing usual method of radium treatment. Two standard containers, each with 50 mg. of radium in monel shells 0.3 mm. thick and 15 mm. in length, are inserted following application of local anesthesia. An attempt is made to slide the applicators into place so that the centers of each applicator overlie a eustachian tube orifice. Treatment time is usually 12 minutes. Three treatments are given at two week intervals.

50 mg. of radium, using various filters and times (table 1). At the surface of the monel metal applicator the beta rays predominate, while after passing through 1 cm. of tissue the radiation is virtually all gamma. Ionization measurements close to the applicator record the summation of beta and gamma ray "roentgens"; at a distance of about 1 cm. they record the gamma ray roentgens, the beta having been absorbed.

Fowler also gives the estimated tissue dose in roentgens at various depths in tissue from the surface of a standard monel metal applicator, as determined by Quimby (table 2).

3. (*a*) Crowe, S. J., in Jackson and Jackson: Diseases of Nose, Throat and Ear, Philadelphia, W. B. Saunders Company, 1945, p. 166; (*b*) Irradiation of Nasopharynx, Ann. Otol., Rhin. & Laryng. **46**: 779 (Dec.) 1946; (*c*) Crowe, S. J., and Baylor, J. W.: Prevention of Deafness, J. A. M. A. **112**: 585 (Feb. 18) 1939.

4. (*a*) Hendricks, J. E., and others: Use of Radium in Aero-otitis Control Program of the Army Air Forces: Combined Report by the Officers Participating, Ann. Otol., Rhin. & Laryng. **54**: 649 (Dec.) 1945; (*b*) Northington, P.: Radium Therapy in Otitis Media, U. S. Nav. M. Bull. **46**: 1559 (Oct.) 1946; (*c*) Shilling and others.[3]

5. (*a*) Crowe.[3a] (*b*) Proctor, D. F.: Radiation Therapy for Removal of Adenoid Tissue, Arch. Otolaryng. **45**: 40 (Jan.) 1947.

6. Fowler, E. P., Jr.: Irradiation of the Eustachian Tube, Arch. Otolaryng. **43**: 1 (Jan.) 1946; Eustachian Tube Irradiation, New York State J. Med. **49**: 187 (Jan.) 1949.

Carl Braestrup [7] constructed a series of cylindrical ionization chambers of polystyrene with the inner walls coated with aquadag to make them conducting. By the use of various chambers the air spacing was varied from a few millimeters down to 0.25 mm. Measurements were also made after the rays had passed through tissue-equivalent absorbers. The results obtained by two different measuring systems varied within a few per cent (table 3).

Quimby's and Braestrup's figures, obtained independently, are in close agreement and, in view of their careful work, are believed to be the most accurate available.

In the nasopharynx the space between the tube orifices is 4 cm. and the eustachian tubes are approximately 3.6 cm. in length. Table 4 shows the radium dosage in roentgens at various points in the nasopharynx and tubes.

It has been shown by the above tables that there is a tremendous "fall off" in the roentgens delivered at short distances from the containers. Extremely large doses are given to the eustachian orifices with proportionately little radiation reaching all the other lymphoid tissue in the nasopharynx, the tubes and the middle ear. No other nonmalignant condition is given such heavy radiation. Further, as Fowler observes, "The exact dose in each case varies, since the apparatus lies at different distances from the tissue in different persons." Radium, as generally employed, is therefore potentially useful in control of localized lymphoid hyperplasia but not for the usual patient having aero-otitis with deafness, who has generalized lymphoid hyperplasia.

Severe epithelitis may result from the above dosages (Fowler). One of us (L. H. G.) has been informed of three patients with radiation ulcers in the posterior nasopharynx from such use of radium. Robbins and Schultz [8] note that erythema on the skin of the forearm has been seen following as little as about 700 r in a single dose. In a benign condition an erythema dose usually should not be exceeded. In acute infections radium should be employed with extreme caution; if not deferred, the dose should be cut in half.

Hendricks' group in the Air Force [4a] treated 6,881 men with 14,045 applications of radium and noted no burns or ulcerations, using eight and one-half minutes, two or three times. He states, however, "Throughout the entire project the rapid shifting of flying personnel made follow-up studies extremely difficult."

The usual precautions for handling and storing radium must be used. Braestrup calculated the dosage received by the operator and estimated that the treating of three patients a week would result in the tolerance dose to the skin of the hands.

Roentgen Therapy.—We believe that the simplest and safest method of irradiation of lymphoid tissue in the nasopharynx is the use of roentgen rays externally. The only "disadvantage," if it can be called such, is that there must be four to six treatments rather than three and that these usually necessitate attendance at a roentgenologist's office or department.

No anesthesia is required. The treatment can be given easily to children. We have treated most of the patients in the age group 1 to 4 without restraints, after the child finds that the initial treatment is painless. We have not had to discontinue treatment because of noncooperation. The great advantage of roentgen therapy over radium is that the whole lymphoid-bearing area of the nasopharynx is included in the field. Thus the entire tubes are treated as well as the adenoids, the fossa of Rosenmüller and the scattered lymphoid deposits on the nasopharyngeal walls. Further, the dose is relatively homogeneous in comparison with the exceedingly uneven dose around the radium tubes. Centering can be accurate and easily duplicated.

Roentgen ray treatment usually consists of the use of medium or high voltage beams 140 to 200 kvp, with a half-value layer of 0.3 to 1.0 mm. Cu. The field sizes in the literature vary considerably and range from a 5 cm. circle to 10 by 15 cm. fields. The distance also varies but is usually 40 cm. Treatments range from 75 to 150 r each and from three to six in number (fig. 3). We have found 140 kvp with a half-value layer of 9 mm. Al. to be entirely satisfactory, although we often treat patients with 200 kvp and a half-value layer of 1 mm. Cu. The field size should be small enough to avoid dryness of the mouth but adequate to cover all the involved area. We employ a vertical field 6 by 7 cm. in size. Usually six treatments of 100 to 150 r air to each side are given at weekly intervals. The patient is immobilized in lateral position and the fields centered carefully 1 to 2 cm. anterior to the inferior border of the tragus (this is approximately over the temporomandibular joint).

The average adult skull measures 14 cm. in width at the level of the nasopharynx; the eustachian tube orifices are 5 cm. deep. The variations in skin and tissue dosage in roentgens at the orifices and midline are compared in table 5, using beams of various half-value layers and giving 100 air r to each side with a 50 square cm. field.

It is thus seen that half-value layer 1 mm. Cu. is the most efficient of the three beams but that there is little difference between employing half-value layer 9 mm. Al. and half-value layer 1 mm. Cu. With these doses the treatment time is short and the skin dose well below the erythema dose. No late skin changes have been noted

TABLE 1.—*Depth Doses in Roentgens Around 50 Mg. Radium Tubes with Various Filters (Quimby)*

		Distance from Applicator								
		1 Mm.			1 Cm.			2 Cm.		
Filter	Type of Ray	6⅔ Min.	40 Min.	60 Min.	6⅔ Min.	40 Min.	60 Min.	6⅔ Min.	40 Min.	60 Min.
0.5 Mm. Platinum	Gamma	.....	1,500	2,250	..	265	400	..	70	100
1 Mm. Brass	8% Beta	.....	1,800	.....	..	300	...	..	70	100
0.3 Mm. Monel	75% Beta	1,520	.....	.....	55	...	...	15	..	...

7. Braestrup, C. B.: Measurements of the Radiation Dose from the Nasopharynx Radium Beta—Gamma Ray Applicator, read before the Radiological Society of North America, Cleveland, December 6, 1949.

8. Robbins, L. L., and Schulz, M. D.: Potential Hazards from Radiation Treatment of Hypertrophied Lymphoid Tissue in Nasopharynx, Laryngoscope 59: 147 (Feb.) 1949.

during a period of 20 years, and no permanent loss of facial hair. No changes have been seen or reported in the temporomandibular joint.

RESULTS OF TREATMENT AS REPORTED IN THE LITERATURE

Radium Therapy.—Because of the variation in radium and roentgen ray dosage in the literature and variations in presenting complaints, the published results are difficult to compare. These results would have to be analyzed separately for each presenting sign or symptom to be significant. From a multiplicity of reports we present the following results as fairly representative:

Fowler [6] found that, of 66 Air Force personnel, 69 per cent obtained relief of aero-otitis after radium treatments. Shilling [7] reports over 90 per cent improvement in aero-otitis media. He used three to eight radium treatments of eight to 10 minutes each.

Proctor, Polvogt and Crowe [9] report on radium therapy results in 835 patients followed two and one-half to 15 years:

Of 128 treated because of frequent severe colds, 40 per cent showed marked improvement.

Of 110 with postnasal drip due to nasopharyngeal infection, 25 per cent had complete relief, and 75 per cent were improved.

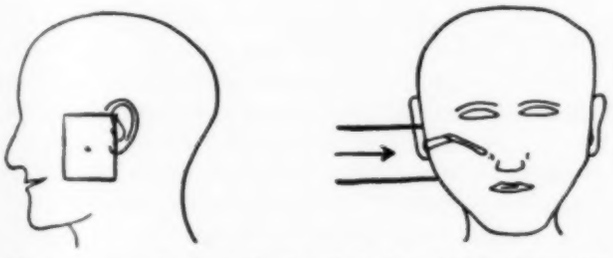

Fig. 3.—Diagram showing authors' method of roentgen treatment. The patient's head is placed in true lateral position. Fields 6 by 7 cm., with the long axis vertical, are centered 1 to 2 cm. anterior to the inferior border of the tragus. Irradiation is given with medium or high voltage beams (half-value layer 9 mm. Al. or 1 mm. Cu.). Doses of 100 to 150 r, measured in air, are given to each side of the nasopharynx, weekly, for six treatments.

Of 282 with impaired hearing attributable to obstructed eustachian tubes, 85 per cent had "great and lasting" improvement.

Of 112 with complaints thought to be attributable to a focus of infection in the nasopharynx, 90 per cent were improved.

Of 87 with partial nasal obstruction due to adenoid tissue, 90 per cent were completely relieved and the other 10 per cent improved.

Of 97 with tinnitus, only three had relief, and, of nine with fulness in the ears, eight were relieved.

A report of the results of radium treatment of the nasopharynx in asthmatic patients is given, among others, by Cohen and Fisher,[10] who consider radium an auxiliary to other types of asthmatic treatment. Proctor and Crowe found improvement in children with bronchial asthma when the asthma was on an infectious basis.

Hendricks [4a] reports on results in the Army Air Force's use of radium for aero-otitis. Because of rapid shifting of flying personnel, follow-up was difficult. Of 575 patients who received two treatments, approximately 65 per cent had objective improvement, and of 778 who received three treatments, approximately 90 per cent had objective improvement. Subjectively, there was a wide variation in the percentage improved, depending on the complaint. Collins, in the same report, found 78 per cent subjective and 94.6 per cent objective improvement 30 days after the third radium treatment in his group of 230 men. The results of the other co-authors in this symposium are similar to those just quoted.

TABLE 2.—*Depth Doses in Roentgens Around 50 Mg. Radium, in Standard Monel Metal Applicator (Fowler & Quimby)*

Time, Min.	Distance from Applicator			
	1 Mm.	2 Mm.	10 Mm.	30 Mm.
8.5	1,940	1,150	42	5
12	2,740	1,620	60	7

TABLE 3.—*Depth Doses in Roentgens Around 50 Mg. Radium in Standard Monel Metal Applicator (Braestrup)*

Depth, Mm.	1 Min.	12 Min. 1 Treatment	36 Min. 3 Treatments
Surface	370	4,450	13,350
0.5	225	2,700	8,100
1	168	2,020	6,050
2	96	1,152	3,460
5	23	276	830
10	5	60	180
20	1.3	14.4	43

Roentgen Therapy.—Rossitto [11] employed roentgen therapy at 200 kvp and half-value layer of 1 mm. copper. The field sizes varied and usually included both the nasopharynx and tonsillar regions. He gave 60 to 125 r to each side four to six times and obtained "90 per cent good results" in children with tonsillitis, sore throat, mouth breathing, nasal obstruction, otitic complaints and, in some cases, asthma. He judged his results in the relief of symptoms by questioning patients and referring physicians.

TABLE 4.—*50 Mg. Radium in Standard Monel Metal Container in Each Posterior Nasopharynx (Using Braestrup's Figures)*

Time, Min.	Dose at Each Tube Orifice	Dose 1 Cm. up Tube	Dose at Midline	Dose 2 Cm. up Tube	Dose 3 Cm. up Tube
12	4,450 r	60 r	28.8 r	14.4 r	7 r
36	13,350 r	180 r	86 r	43 r	21 r

TABLE 5.—*100 Air r Each Side to 50 Square Cm. Field at 40 Cm. Focus-Skin Distance*

KVP	Filter	Half-Value Layer	Skin Dose (Including Exit)	Depth Dose at Each Orifice	Depth Dose at Midline
120	3 mm. Al.	4 Al.	139 r	74 r	66 r
140	0.25 Cu.	9 Al.	147 r	100 r	96 r
200	0.50 Cu.	1 Cu.	148 r	104 r	100 r

Reeves [12] used 100 kv. and 3 mm. Al., filtered, giving 100 r to each side weekly, four to six times. He finds that "Roentgen therapy gives results when all other methods have failed."

9. Proctor, D. F.; Polvogt, L. M., and Crowe, S. J.: Irradiation of Lymphoid Tissue in Diseases of Upper Respiratory Tract, Bull. Johns Hopkins Hosp. **83**: 383 (Nov.) 1948.

10. Cohen, V. L., and Fisher, J.: Evaluation of Radium Treatment to the Nasopharynx in Asthmatic Children, J. Allergy **20**: 328 (Sept.) 1949.

11. Rossitto, A. F.: Roentgen Treatment of Infection of Tonsils and Postpharyngeal Lymphoid Tissue in Children, Radiology **48**: 118 (Feb.) 1947.

12. Reeves, R. J.: Radiation Treatment of Hypertrophied Lymphoid Tissue of Pharynx and Nasopharynx, Am. J. Roentgenol. **37**: 510 (April) 1937.

Young and Woutat [13] give the results on 116 patients treated for deafness resulting from eustachian tube obstruction by lymphoid tissue. Results were determined by tuning fork tests, ability of the patient to hear the whispered voice and periodic audiograms in all patients old enough to cooperate. Of 63 patients under 15, 72 per cent had significant improvement or return to normal hearing, 17 per cent, partial improvement and 11 per cent, no response. In 53 patients over 15, 49 per cent had noticeable improvement or return to normal hearing, 23 per cent, partial improvement and 28 per cent, no response. Of 36 with chronic otitis, about 61 per cent were healed.

Results of Roentgen Therapy.—We have treated 720 patients for lymphoid hyperplasia in the nasopharynx with the technic as given above. These were, in the main, patients previously untreated, but a few were included who had had unsuccessful radium treatments or in whom radium could not be inserted due to their being uncooperative. All patients were referred by otolaryngologists or general practitioners and suffered from one or more of the usual complaints. The evaluation of results in these patients was made by the patients and/or the referring

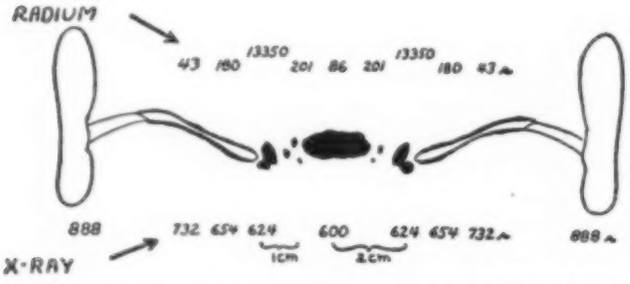

Fig. 4.—Diagram showing the comparative doses of irradiation applied to the pharyngeal and tubal areas during a full course of treatment with radium or roentgen rays. The upper row of figures gives the dose in roentgens received with three applications of radium as specified in the text. The lower row of figures gives the dose in roentgens using roentgen beams as described in the text. Note that much more homogeneous irradiation is obtained with roentgen rays and that the dose at the tubal orifices is excessive with radium.

physicians, who frequently checked progress with audiograms and direct nasopharyngeal observation.

One of the referring otolaryngologists had been using radium for five years and then had discontinued it in favor of roentgen rays because "Radium gave only localized shrinking of hyperplastic tissue and left the bulk of the lymphoid nodules unchanged." With roentgen rays he noted that about 55 per cent of his adult patients with deafness secondary to hyperplastic lymphoid tissue around the eustachian orifices were cured with a single course. In the remaining 45 per cent "Sufficient lymphoid tissue remained to cause persistent signs or symptoms." Some of these were referred for a second course with good results. His opinion is that almost one half of the adult patients with the complaint of deafness require heavier roentgen dosage than is usually employed to eradicate all the lymph nodules. He has found, over a period of years, that roentgen rays give more satisfactory results than do radium rays, presumably because of their more even distribution of ionization. Another referring otolaryngologist found that approximately 90 per cent of his patients were symptom free after a single course of roentgen therapy. Many of these patients, however, were children and presented a variety of complaints besides deafness.

In our entire series 60 to 90 per cent were relieved of presenting signs or symptoms by the first course of roentgen treatment; the rest had partial or no relief of symptoms. About 5 per cent of the patients returned for additional irradiation, with resultant improvement.

RELATIVE MERITS OF ROENTGEN AND RADIUM THERAPY

Crowe observes, regarding roentgen treatment:

"Since approximately one-half of the rays delivered at the skin surface are absorbed by neck tissues before they reach the nasopharynx, it is evident that several portals must be used in order to prevent skin irritation. The fact that a large percentage is absorbed necessitates a dosage on the skin surface much larger than is necessary to correct the lesion in the nasopharynx for which the treatment is given. This excessive dosage subjects the centers of ossification for the growing bones of the face and skull to a large amount of radiation which may do harm in a child and is of no value in the treatment of the primary condition in the nasopharynx. Furthermore, it is difficult to maintain young children in a position for accurate cross-firing for the duration of the treatment . . ."

If this paragraph is analyzed, it brings out several interesting points and indicates why roentgen, not radium, therapy is actually advised by many otolaryngologists. In the first place, the use of "several portals" is not necessary; two portals will deliver a satisfactory amount of radiation to all the involved tissues and not merely to the eustachian orifices, as is done with radium. With proper choice of beam, there will be no skin or soft tissue damage (fig. 4).

Comparison of the charts giving the distribution of energy around radium tubes and those for the distribution of roentgen rays shows the tremendous "drop off" in the dosage from the former, so that at 1 cm. there is very little radiation (fig. 4). Since the two eustachian tubes total 7.2 cm. in length and the space between them measures 4 cm., the area of potential lymphoid tissue involvement measures 11.2 cm. in width. This entire zone should be irradiated.

Most of the articles on the use of radium caution against roentgen rays because of "damage to the normal tissues traversed in using external beams." Actually, we have been able to find no reports of damage from roentgen therapy in the doses specified, after an extensive search for such in the literature. We are firmly convinced that in the use of the method we describe there is no danger either to the skin, the underlying soft tissues or the bones. With second courses there may be temporary tanning of the skin.

Ashbury [14] employs 800 to 1,200 tissue r in four to five weeks and has found no side effects. Much larger doses have been used over growing epiphyses without damaging growth in other locations, for other conditions. Not only have thousands of children been treated for

13. Young, N. A., and Woutat, D. H.: Treatment of Certain Types of Deafness by Roentgen Ray Therapy, Ann. Otol., Rhin. & Laryng. **57**: 984 (Dec.) 1948.

14. Ashbury, H. H.: Radiation Therapy of Lymphoid Tissue in Nasopharynx and Pharynx, Radiology **43**: 250 (Sept.) 1944.

lymphoid hyperplasia but many more for epilation of the scalp for ringworm, and no cases of damage to growing bone or to the pituitary gland from moderate dosage have been reported.

It has been stated that external roentgen radiation causes severe dryness of the mouth. Actually, dryness occurs only with the use of large fields, which involve the salivary glands; these are rarely employed. Since irradiation of the involved tissue may be done with small beams, large fields are not required in the average case. Seedorf and McKay [15] note the occurrence of roentgen parotitis for one to two days after the first treatment, but they use 10 by 10 cm. fields, which, of course, cover a large portion of the parotid. If the lymphoid tissue lying on the posterior oropharyngeal wall or the tonsils are to be included in the ionizing beam, a 5 by 8 or 5 by 10 cm. field should be used, but for cases with the hyperplasia limited to the eustachian areas and nasopharynx, a 6 by 7 cm. field, accurately centered, is all that is necessary; with such fields temporary parotid swelling rarely ensues.

Uhlmann and associates [16] and Schenck [17] have reported microscopic studies made on tonsils and hyperplastic lymphoid tissue removed at various intervals following termination of roentgen and radium treatment; no unwarranted effects secondary to radiation were produced and no changes noted indicating any adverse effects on the tissues. The qualitative histological changes in tissue are identical with comparable doses of filtered roentgen rays or radium rays.

Schenck notes that, prior to radiation, great variety in the cellular structure of the lymphoid tissue is found, and, because of this caution should be observed in interpreting single specimens. The initial changes noted were essentially those of chronic infection and chronic inflammation. After irradiation by radium and roentgen rays, Schenck took serial biopsies at two week, four week and six month intervals. The least change was edema of the follicular structures without desquamation or karyolysis. The maximum finding was swelling of the epithelial cells, with vacuolation and small hemorrhages. There was destruction of endothelial cells. Detachment of ciliated cells was not uncommon. The adult lymphocytes showed little alteration, but the young lymphocytes showed nuclear disturbance or dissolution. The most pronounced changes were in the germinal centers, with liquefaction of many of the cells. Examination after six months showed beginning regeneration, with reappearance of lymphocytes. The germinal centers had not reappeared. There was diminution of fibrous tissue. Often there was no evidence of chronic inflammatory changes.

As to the clinical results of irradiation, it has certainly been shown in thousands of cases that either roentgen or radium therapy can be satisfactory. The dose of radium rays in gamma roentgens must be larger than the corresponding dose of roentgen rays in roentgens to produce similar clinical and histological changes in lymphoid tissue. It must be remembered that the results of irradiation are never immediate but that the changes occur slowly after treatment of one to three months.

Radium Therapy.—The advantage of radium therapy is that it can often be done in the otolaryngologist's office in two or three treatments; however, some cases require a second course (Proctor). Distribution of ionizing energy is adequate if the lymphoid tissue involvement is limited in extent and is not associated with the usual generalized nasopharyngeal hyperplasia.

The disadvantages of radium are several. We have shown the very intense ionization close to the applicator and the rapid "fall off" at a short distance. This means that placement must be exactly on the lymphoid tissue and, further, that only the hyperplastic lymphoid tissue in the immediate vicinity of the applicator receives an adequate dosage. Radium must be used cautiously, if at all, after previous irradiation. It should be used in small doses, or treatment should be deferred, in the presence of severe infection. There is definite danger to the operator on repeated use of radium, and care must be taken to keep his own dosage within tolerance. The beta radiation can be avoided by the use of two pairs of rubber gloves, but the only protection against gamma rays is distance. The physician should stay 30 feet away from the patient once the radium is in place. The radium must be stored in a lead cylinder 4 to 6 inches (10.16 to 15.24 cm.) in thickness and the usual precautions observed in handling it.[4b]

The treatment is not as harmless as generally considered. There have been cases of radium ulcers on the posterior nasopharynx from the above dosages. As noted above, Braestrup estimates that in treating three patients a week permissible tolerance of the hands of the physician or nurse would be reached; therefore, relatives should hold the applicator when such is necessary. Fowler [6] has seen cracked thumb nails secondary to lifting the nostril and inserting applicators. Robbins and Schulz estimate that the operator receives 10 r a treatment at the outer tip of the handle of the applicator; this is quadrupled halfway down the handle. Crowe, on the other hand, states that he has used radon or radium daily for 20 years without any ill effects. Braestrup believes that the regularly employed dose may be productive of late radiation damage to the patient, with ulcers or even neoplasm in the nasopharynx. These changes may take 10 or 20 years to develop.

Robbins and Schulz warn against the routine use of radium or roentgen rays in benign conditions. Postradiation damage may be years in developing, and with the relatively recent use of the radium monel applicator, with its exceedingly high output, late untoward results may occur. These authors suggest the determination of an erythema dose on the arm of the operator and advise that less than an erythema dose be administered in the nasopharynx. As little as 700 r given with mildly filtered radium may produce an erythema of the skin, and some late scarring may follow. With the larger doses routinely employed in the radium treatment of the nasopharynx, the likelihood of atrophy, necrosis or even neoplasia increases.

15. Seedorf, E. E., and McKay, E. D.: Roentgen Therapy for Lymphoid Hyperplasia of Nasopharynx, Texas State J. Med. **43**: 457 (Nov.) 1947.

16. Uhlmann, E. M.; Rosenblum, P., and Perlman, S. J.: Radiation Therapy of Tonsils and Adenoids, Arch. Pediat. **65**: 532 (Oct.) 1948.

17. Schenck, H. P.: Influence of Nasopharyngeal Hyperplasia on Ear: Histologic Examination of Hyperplastic Lymph Follicles After Irradiation, Laryngoscope **51**: 780 (Aug.) 1941.

Roentgen Therapy.—The "disadvantage" of roentgen therapy is that it necessitates three to six treatments. There occasionally may be transient parotid swelling and temporary dryness of the mouth if large fields are used.

The advantages of roentgen therapy, as compared with those of radium therapy, are that no anesthesia is required, it can easily be given to children and there is no pain. The centering of the roentgen beam can be exact and duplicated without difficulty. One of the great advantages, as we have shown above, is that the entire lymphoid-bearing area can be irradiated with an adequate dose without harm to the skin, underlying tissues or bones. The weekly dose is only a fraction of an erythema dose. When the roentgen treatment is protracted ionization is more gradual and "gentle" than it is with radium.

COMMENT

The clinical value of radium or roentgen therapy in the control of lymphoid hyperplasia of the nasopharynx has been established over a period of years in thousands of cases. The recognition of the importance of these cases rests with the general practitioner and the otolaryngologist. The realization of the severe consequences of chronic eustachian tube block with resultant deafness and the multiplicity of signs and symptoms of lymphoid hyperplasia should encourage the physician to be alert to detect these conditions and to expose them to safe radiation therapy.

SUMMARY

We discuss the relative advantages and disadvantages of roentgen and radium therapy in the treatment of lymphoid hyperplasia of the nasopharynx that causes deafness and allied auditory disturbances.

We illustrate the distribution of ionization through the involved tissues and adjacent areas, using the two common forms of radiant energy, and we report some recent data on the beta and gamma dosage from standard radium applicators.

In the light of these physical data we show that the dosage throughout the zone commonly involved in lymphoid hyperplasia is more homogeneous and efficient with external roentgen beams than with intranasal radium beams.

We also show that the dose in the immediate proximity of the radium applicators is some 10 times the dose ordinarily regarded as reasonable or safe for the treatment of nonmalignant conditions.

From personal experience in the treatment of 720 cases, we report excellent results with roentgen therapy in from 60 to 90 per cent of the cases, depending on the severity of the disease and the nature of the subjective complaints. These results were validated by independent clinical observation of the referring physicians, many supplemented by audiometric and other objective tests.

The maximum tissue dose required for cure when roentgen therapy is employed is much lower than when standard radium applicators are used: roentgen therapy is consequently safer and should, in our opinion, be employed as the method of choice.

450 Sutter Street.

ABSTRACT OF DISCUSSION

DR. U. V. PORTMANN, Cleveland: As stated by the authors, there are reports of ulcerations and other injuries attributed to the radiation from nasopharyngeal applicators. It is possible that not all are due to direct radiation effects but may be the result of injudicious treatment in the presence of acute infection or of unnecessary trauma. Nevertheless, the applicator dosage charts indicate that the quantities of radiation from them at the eustachian orifices are relatively large in comparison with the amounts necessary for destruction of lymphoid tissue or for effectual irradiation of the nasopharynx by roentgen therapy. The particular indication for the radium applicator is for the small masses of lymphoid tissue at the orifice of the eustachian tube or in the fossa of Rosenmüller that cause symptoms. Even this localized treatment, in the presence of acute infection, may be injurious. The reaction to the combination of infection and radiation may result in temporary obstruction to the eustachian tube, causing otitis media, or resulting in later permanent obstruction. Correctly administered roentgen therapy will not cause such damage in the presence of infection. Radium therapy should not be used to destroy large masses of lymphoid tissue in the nasopharynx. The quickest way to eliminate them is surgical removal; roentgen therapy is efficacious, especially if acute infection is present, or postoperatively if there are remnants. Also, roentgen therapy is preferable for primary or secondary enlargement of the lingual tonsils sometimes associated with hyperplastic lymphoid tissue in the nasopharynx. This treatment is indicated for otorrhea, resulting from the same condition, when the eustachian tube is patent yet mucoid material forms in the middle ear. In such cases the eardrum usually is damaged or destroyed. Discussion of the technic for roentgen therapy sometimes leads to unnecessary controversies and may be unimportant. The authors have found "140 kvp with a half-value layer of 9 mm. Al. entirely satisfactory". I was one of the first to prove that biologic effect is independent of quality and that the physical dose applied is of major importance; therefore I consider the voltage and filter unimportant. I prefer 200 kv. therapy because there is less possibility of skin changes and the depth dose is somewhat higher. I prefer to direct the irradiation obliquely through circular portals over the maxillary antrums. The distance from these portals to the orifices of the eustachian tubes is the same (about 6 cm.) as it is through the lateral portals used by the authors. The entire nasopharynx can be treated by angulation through small maxillary portals and irradiation of the parotids, teeth and temporomandibular joint is avoided.

DR. HENRY J. ULLMANN, Santa Barbara, Calif.: I want to add one more point that Dr. Portmann left out. How many of these children receiving this relatively massive local dose of radium are going to turn up with atresias, fibrotic areas or late radiation breakdowns, one, two, three, four, five or six years later? And the physician who sees them has never heard of their having had radium, and wonders how he is going to account for it. There are late effects that are extremely important, and I am frankly much worried at the percentage of those that will occur after the recommended dose of radium but will not occur with properly given roentgen ray therapy.

DR. JOHN O'SULLIVAN, Melbourne, Australia: I should like to congratulate the speaker and the co-authors of the paper. I should like to ask only one question. In the presence of severe infection, does Dr. Mottram in any way modify the dosage administered, especially in the early cases? I have personally carried out this method, and I start off with a much smaller dose; I am just wondering whether she has in any way found that necessary.

DR. MARTHA E. MOTTRAM, San Francisco: We prefer to have the otolaryngologist try to clear the infection in the nasopharynx. Otherwise, if we start radiation therapy, the dose is cut down, and, of course, with radium therapy in acute infection treatment should be deferred or it should be cut down very considerably.

CHAIRMAN: You said the radium therapy should be cut down?

DR. MOTTRAM: Or deferred.

CHAIRMAN: But you have not had any difficulty with the use of roentgen therapy in cases that have shown infection?

DR. MOTTRAM: No, we have cut our doses, but we prefer to have the infection cleaned up first if it is severe.

SPECIAL ARTICLE

BENIGN AND MALIGNANT DISEASES OF THE BREAST

Edward J. McCormick, M.D., Toledo, O.

From time to time there will be published in THE JOURNAL *review articles intended for the general practitioner. Dr. McCormick's article is one of this series.*—ED.

Many of our ideas regarding breast tumors and cancer and the results of treatment are misleading for various reasons. Surgeons generally are inclined to speak of breast operations in numbers that far exceed the incidence of breast cancer in the experience of the individual operator. A recent survey at one hospital, where I participated in a heavy surgical schedule (7,059 operations in 1949 and 7,032 in 1950) and where admissions to all departments average 13,000 a year, showed that 129 breast specimens were examined in 1949 and 99 in 1950. Of the 228 biopsies done, 59 were on adenocarcinomas. A similar ratio has been found to exist in other large general hospitals in communities of 200,000 or 300,000 inhabitants. There is, of course, no doubt that some surgeons in a few centers, who have devoted themselves in large part to breast surgery, have operated on large numbers of patients with breast cancer, but this is not true of the average general surgeon. The busy operator will be surprised if he reviews his last 10,000 operative procedures to find that he has done comparatively few radical operations for breast cancer.

Adair [1] states that breast cancer is the commonest type of cancer found in women, and he notes that in New York state there are 60 women per 100,000 population in whom breast cancer develops or one new breast cancer develops in women annually to each 1,666 of the population. This means, according to Adair, that in a city of 100,000 population not more than 60 new breast cancers would develop in a year. The probability that a woman will acquire cancer of the breast is higher than the probability that the same woman will acquire cancer of the cervix, uterus or ovary, according to a survey made by the Bureau of Cancer Control of New York state in 1948 and cited by Adair. These figures would be found true in the average community. In a city of 300,000 population 180 cases in a year divided among the qualified operators give each surgeon few cases and the occasional operator little experience in this field. It has been estimated that 12,000 women die each year in the United States from breast cancer. It has been said that about 4 per cent of all female adults acquire the disease.

I think it can also be stated that the various prognostic classifications of breast cancers are faulty. The fact that the patient has a small movable tumor and no palpable axillary nodes does not necessarily place her in a group in which 80 per cent or more cures may be expected. Distal metastases may be present. Unless a more diligent search by x-ray and physical examination is undertaken, the family, the patient and the surgeon may be disappointed. It is also true that the larger tumor with some fixation and palpable axillary nodes may still be localized in the breast and axilla.

No statistics dealing with results of radical breast surgery should be based entirely on the so-called five year cure. Cancers do recur 10, 15 and 20 years following radical mastectomy. Five year salvage is not permanent cure.

Examinations of breasts are being conducted by physicians and patients more frequently because of publicity and information reaching the laity. Biopsies are increasing in most hospitals. Prevention is always superior to attempted cure. More radical treatment of questionable benign and so-called premalignant conditions should be considered. I see no reason for too much conservatism in management of so-called chronic cystic mastitis, in which a local biopsy removes only a small part of a disseminated condition that is frequently painful and considered by many as chronically irritating and capable of undergoing malignant change. There are opinions to the contrary. Some experienced men have said, in effect, that so-called chronic cystic mastitis will subside with the menopause. This may be true, but the real answer as to what a physician should do in such a case is obvious if he has as much concern for the patient as he would have for his mother, wife or sister.

In my experience, the type and location of the growth and the age of the patient are perhaps more important than the size of the mass or its movability.

The connection between breast tumors and endocrine activity deserves continued study, and this is especially true so far as replacement therapy is concerned. While it is said that cancer of the breast can be caused by administration of estrogens in the experimental animal but not in the human, the prolonged administration of certain preparations causes changes in the female genital tract and in the breast. This is especially true of the too ambitious use of diethylstilbestrol (premarin,® a water-soluble estrogenic substance) and other products. If this type of therapy is necessary, the patient should be under observation and the breasts should be examined at frequent intervals.

Testosterone has a definite place in the treatment of breast cancer. One of my patients, with bone and soft tissue recurrences, pathological fractures of several ribs and fluid in the pleural cavity, requiring thoracentesis on three or more occasions, has shown no recurrence after testosterone therapy. Seventeen thousand milligrams has been administered by implantation and by injection. The result has been amazing. Other patients have responded in degrees that could be described as good, fair and poor. It is astounding to me that cancer of the breast can present so great a variation of response

1. Adair, F. E.: Practitioner **165**: 473-481, 1950.

to all forms of treatment and to all combinations of recognized surgical and therapeutic measures. I have seen cases in which testosterone propionate had no effect. Some patients have seemed to improve to a degree after cessation of treatment. Estrogens have been used. My observations of the efficacy of female hormones have been limited and the results not impressive. I have been enthusiastic in my use of testosterone, but extremely cautious in my use of estrogens, in breast cancer. I have felt at times that patients with breast disease who return to their homes after surgery and radiation should be warned against female hormone therapy unless it is administered by someone expert in the field of cancer. George Crile's statement years ago that sterilization of the breast cancer patient seemed helpful, and the subsequent observation by others that orchidectomy and diethylstilbestrol treatment were indicated for cancer of the prostate gland and testosterone therapy for the improvement of some patients with breast cancer—both impress me with the fact that there are powerful extracts and drugs whose complete potentialities may not be understood. The endocrine glands and substances present a rich field for the researcher in cancer. In this connection, reports have reached me concerning the development of gynecomastia and breast cancer in patients with prostate disease who are on diethylstilbestrol therapy. One such patient has been operated on recently by one of my colleagues.

I have removed many benign tumors and some carcinomas from male breasts. The results of treatment of cancer of male breasts are very poor.

I have no hesitancy in advising surgical or x-ray castration in the child-bearing group. Cancer of the breast in young women and in pregnant women has pathological potentialities, I have found, which might be compared to the physical powers of the atomic bomb. Pregnancy is a stimulator of cancer of the breast or the cervix. The most rapidly fatal cases in my series have been among the younger patients with active gonads and pregnancy.

No consideration of the breast is complete without some understanding of the profound changes occurring in the organ from birth and through puberty, the menstrual periods, pregnancy and the atrophy of old age. The female breast is in a constant state of activity. These changes are physiological, and they are hormonal in origin. The physiological, embryological and hormonal influences on the male and female breast are important in the interpretation of pathology and the treatment of all breast lesions whether benign or malignant.

EMBRYOLOGY

About 55 years ago Schultz (cited by Fitzwilliams [2]) demonstrated epidermal ridges extending from the axilla to the groin in early pig embryos. These lines became separated into epidermal elevations as age advanced. This line is well developed in the human embryo 15 mm. long, and it segments when the embryo is 26 to 60 mm. long. These areas were called *Anlagen* by the Germans and milk spots by the English. The embryonal development of the breasts, therefore, makes possible many anomalies. Among these are (1) inverted nipples, (2) amastia (absence of the breasts), (3) polymastia, (4) hypertrophy, (5) polythelia, (6) gynecomastia and (7) athelia (absence of the nipple).

Of special interest in the anomalous group is polymastia, the multiplicity of mammary glands, which presents the possibility of primary breast tumors in the axillas, the abdominal wall, the groin and the thighs or buttocks. Breast tissue may be found in these locations with athelia or absence of the nipple. Hypertrophy is sometimes difficult to distinguish from malignant degenerative changes. It is a surgical condition, incident in both young and old, and it can occur in any decade of life after puberty.

Breast development in the male should be observed at frequent intervals and especially in patients on hormone therapy. Any deviation from normal in the human breast makes possible the appearance of unsual pathology.

There are certain conditions in the breast that, while not malignant, should be clinically considered so until proved otherwise. Among these are (1) adenomas or fibroadenomas, (2) myxomas, (3) chondromas and osteomas, (4) angiomas, (5) chronic mastitis and chronic cystic mastitis and Schimmelbusch's disease, adenosis.

Adenomas, once their capsule is ruptured, may become infiltrative if not malignant. Fibroadenomas are hard, encapsulated, freely movable tumors. Some intracanalicular fibroadenomas have been known to grow rapidly, producing skin necrosis and forming an ulcerating mass.[3] Myxomas, chondromas, osteomas and angiomas are very rare and do not become malignant.

I have previously referred to chronic mastitis or chronic cystic mastitis. This condition seems difficult to distinguish from adenosis. Perhaps these terms designate different states in one pathological condition. Contrary to the views expressed by some other experienced men, I am of the opinion that this condition may be precancerous. Everything necessary for chronic irritation is certainly present. A cancerous change has been found in or subsequent to chronic cystic mastitis. It has been said by Behan [4] that the greatest number of adenocarcinomas arise in the walls of the papillary growths of cysts in chronic cystic mastitis. It has been my practice, when I do a biopsy for a breast lump, and when, in removing the suspicious area, I find the tissue of the breast permeated with dark cysts of varying size, to proceed through a small incision to remove all or most of the breast tissue. Leaving such breast tissue when the frozen section is negative is an invitation to future trouble for the surgeon and continued complaint of lumps and soreness and mental disturbance of the patient.

Cysts of the breast may be classified as (1) simple, (2) galactocele, (3) fibrocystic adenoma, (4) papillomatous and (5) echinococcus.

2. Fitzwilliams, D. C. L.: On the Breast, St. Louis, C. V. Mosby Company, 1924, chap. 1.

3. Bevan, A. D.: The Problem of Tumors of the Breast from the Standpoint of the General Practitioner and Surgeon: Diagnosis, Treatment, Pathology and Prognosis, J. A. M. A. 95: 1311 (Nov. 1) 1930; also, Proc. Internat. Assemb. Inter-State Post-Grad. M. A., North America 5: 140-146, 1930.

4. Behan, A. D.: Cancer, St. Louis, C. V. Mosby Company, 1938, p. 159.

Cancer has been found in cysts of the breast. All cysts should be removed for examination by the pathologist. In connection with chronic cystic disease and cystic adenoma, let us recall that Ewing [5] has pointed out that papillomas or cystic adenomas may be benign as long as the intracystic growth is confined by the cyst wall. When the capsule is penetrated, the growth is definitely malignant.

CANCERS OF THE BREAST

Cancer of the breast may be classified as (1) scirrhus carcinoma, (2) adenocarcinoma, (3) ductal carcinoma, (4) medullary carcinoma, (5) epithelioma, (6) Paget's disease, (7) sarcoma and (8) metastatic neoplasm.

These tumors are all surgical if the diagnosis is early, and there is hope for cure. Surgical palliation may be necessary in certain advanced cases. It is my practice to advise the patient and the family as to what may be expected in the way of cure or palliation. Frank discussion of all probabilities results in better cooperation with the surgeon and radiologist and likewise informs the patient and her family regarding the limitations of the various modes of treatment. When the tumor is classified as to operability and prognosis from the standpoint of the breast and axillary findings, x-ray studies of the bones of the head, neck, chest and trunk are helpful. Positive findings may contraindicate a radical procedure and protect the surgeon and his art from criticism. The discovery of distal metastases will change the surgical and radiologic procedures.

Much confusion exists concerning the pathologic classifications and character of papillary neoplasms of the breast. The two types of papillary neoplasms are the benign intraductal papillomas and the malignant papillary carcinomas. The first type is frequent. The malignant type is rare according to some observers, but other operators have observed an incidence of malignancy of 47.2 per cent in cases in which there was sanguineous discharge from the nipple.[6] Bloodgood concluded many years ago that serous or bloody fluid, in the absence of a palpable tumor, did not indicate cancer. Haagensen, Stout and Phillips advise local excision of the duct and papilloma in the nonmalignant type with a reasonable margin of surrounding breast tissue.[7] If the papillary neoplasm is malignant, radical breast surgery should be done.

PROGNOSIS AND OPERABILITY

The type of cancer cell, the age of the patient and other factors influence operability and prognosis. The following classification, not original with me, has been presented with variations by numerous authors:

1. If the breast contains a small movable tumor and no palpable lymph nodes and there is no evidence of intrathoracic or skeletal metastases, a minimum of 70 per cent of the patients should be alive and well five years after radical surgery, 71 per cent if postoperative radiation has been given. Some authors state that under these conditions 80 to 90 per cent should survive for five years. The point that interests me and all patients is the percentage in this group in which the disease is entirely eradicated and permanent cure possible. All classifications indicate that from 10 to 30 per cent are not alive in this, the most favorable group, after five years. Some of course, die from causes other than cancer.

2. If there is a large tumor in the breast with fixation to the skin or to the pectoral muscles and palpable and microscopic evidence of axillary metastases, 28 per cent of the patients with such manifestations will be alive in five years following radical surgery and 57 per cent will be alive for this period if radical surgery is followed by radiation.

3. Patients with axillary and supraclavicular nodes and distal metastases can be offered little hope. With radiation, 5 per cent or less may live five years.

It is evident, as previously stated, that this and other similar classifications of breast tumors for prognosis are faulty. The curability figures given by different authors vary, and surgeons and radiologists frequently differ in their opinions regarding the classification into which a given patient should be placed. I have seen patients who were treated early promptly develop metastases, and I have in my own practice seen patients who were in class 2 living and well years after surgery and radiation. The pathological picture and the age of the patient are probably the most important factors and should supersede other considerations.

SYMPTOMS OF BREAST CANCER

Every paper and textbook describes and lists the symptoms of cancer. MacCarty [8] has said, "Cancers are not recognized early by the medical profession and never will be until it learns that there are no characteristic signs and symptoms of early cancer."

A history of hereditary influences, trauma, abscess formation, caked breasts, pain and absence of pain, itching, orange peel appearance of the skin, abnormal superficial vein pattern, change in contour and other signs and symptoms are of value, though some are evidence of advanced growth. I prefer to tell my colleagues and patients that "every lump in the breast is a cancer until proved otherwise." Transillumination is impressive but of limited value. I am not an advocate of aspiration of cysts or needle biopsy. Careful and proper examination of all breasts, both male and female, and biopsy of any suspected area offer more to the patient and doctor than do any other procedures. I have not been satisfied with results obtained by the Papanicolaou examination of fluid from the nipple. In this connectoin, removal of a lump or part of a lump from a breast, followed by surgery a week or two later, is the worst possible treatment in the light of our present knowledge.

We hope, of course, that our research workers will develop a technique wherein the Geiger counter may be of value in breast examination and diagnosis. It is my opinion that the doctor or surgeon should forget textbook descriptions and symptoms and resort to biopsy when a lump is found in the breast.

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5. Ewing, J.: Neoplastic Diseases: A Treatise on Tumors, Philadelphia, W. B. Saunders Company, 1922, p. 501.

6. Adair, F. E.: Sanguineous Discharge from the Nipple and Its Significance in Relation to Cancer of the Breast: A Study Based on 108 Cases, Ann. Surg. **91**:197, 1930.

7. Haagensen, C. D.; Stout, A. P., and Phillips, J. S.: The Papillary Neoplasms of the Breast: I. Benign Intraductal Papilloma, Ann. Surg. **133**: 18, 1951.

8. MacCarty, W. C.: Why Cancer Is Not Recognized Early, Am. J. Cancer **22**: 831, 1934.

Biopsy, removing by a good margin the mass in the breast, and frozen section by a capable pathologist should be followed immediately by radical mastectomy if cancer is discovered. All instruments, gowns, gloves and drapes used in the biopsy procedure should be discarded before the major operation is started. Pathological breast tissue cannot be removed without cutting across drainage channels, which in cancer cases probably contain malignant cells that may be transplanted.

The operative technique may vary in radical mastectomy, but regardless of whether a transverse, Halsted or other incision is used, a complete dissection of the axilla should be done and all tissue from the axilla reflected downwards with the pectoral muscles and fascia extending to the rectus sheath. No approach should ever be made for convenience of closure. Skin graft may be necessary on occasion.

The radical surgical treatment is being widened in scope in some centers to include resection of the clavicle and dissection of the neck glands, and removal of involved ribs and of the axillary vein has been advocated. Additional experience with the extension of surgical attack may change to some extent the accepted routine of radical mastectomy, but it seems logical to believe that the large percentage of patients requiring such additional surgical attacks have already developed distal metastases.

Simple mastectomy followed by x-ray therapy is advocated by some and is mentioned only to be condemned. It should also be stated that there is no longer debate regarding the respective merits of surgery and x-ray therapy. The statistics plainly show that x-ray therapy alone is of limited value. Some good surgeons feel that no case of cancer of the breast is cured except by complete surgical removal. I agree with these competent and experienced operators, but my patients all have postoperative therapy because results are improved and one can rarely be certain in cancer surgery that all cells have been removed, regardless of the skill of the operator or the extent of the excision.

SUMMARY AND CONCLUSIONS

In closing, permit me to emphasize some of the important points to be considered in breast cancer.

The breast is one of the most accessible parts of the human anatomy. Examination is simple. Breast pathology should be recognized early by the practitioner if results are to be improved.

Biopsy is the only reliable means of establishing the diagnosis.

The age of the patient and the type of breast cancer are most important in the determination of prognosis.

Complete excision of the breast and axillary contents is absolutely necessary if cure is expected. Operation should be followed by expert radiological treatment.

Early diagnosis and radical mastectomy seem more important to me than extension of the surgical field to the neck, thoracic cage and other structures. Such extension presupposes wide distribution of the disease beyond the scope of the aseptic scalpel.

The endocrine field seems to offer much to the research worker and to the breast surgeon. There is little doubt in my mind at the present time about the possibility of direct relationship between malignant development in certain parts of the male and female anatomy and endocrine activity.

A revision of the accepted preoperative and postoperative yardsticks, having to do with operability, prognosis, five year cures and permanent cures, seems indicated.

This paper and the conclusions contained therein are the result of the examination of thousands of breasts and hundreds of operations upon the breast for benign lesions and malignancies. There seems to be a tendency in the literature today for an ultrascientific appoach to breast lesions. I have never been able to convince myself that catheterization of the ducts, injection of opaque material and other suggested procedures are of great importance. It is my opinion that early biopsy and early operation, when indicated, will improve results, and it is also my belief that the removal of benign lesions will frequently prevent the development of cancer. In my experience, mortality following radical breast procedures, when ample blood replacement is used, is practically nil. I have had but one death among my last 300 patients. I am concerned with the problem of permanent cure. My percentage of permanent cures is in line with the experience of others who do much work in this field. I am always depressed, as is every breast surgeon, when metastasis develops in the so-called early case.

The approach to the treatment of all cancers will change during the next 25 years. The cure will not be within the scope of our present techniques. It will be simplified. It is my hope that the youthful cancer sufferer and those of more years, in the so-called cancer age, will be protected against cancer or, if afflicted, promptly cured. This hope is common to all of us. We have made progress in our attack upon benign and malignant lesions of the breast, but we have a long distance to go and we will have more opportunity of reaching the millenium when we recognize the limitations of our present mode of attack on both the early and late cases.

510-514 Ohio Building (4).

Advice on Diet.—The fundamental principles of medical dietetics are only slowly emerging from an accumulation of scientific data on one hand and a mass of traditional empiricism on the other. Just as the paramount importance of good nutrition in the maintenance of health has become more widely appreciated by medical men in recent years, so the prescription of complicated diet sheets has tended to recede into the background. There can be few instances in dietetic out-patient departments in which the giving out of printed diet sheets is justifiable. Advice on diet should be individual and not done by routine mass-methods, and even in individual cases the actual writing out of detailed diet sheets should rarely be necessary, with a few obvious exceptions. The primary object of a dietetic department should be to spread the gospel of sound nutrition among the population, and the dietetic treatment of various diseases usually only calls for very simple common-sense advice. Yet 15 years ago it was commonly believed by medical men that there was some specific dietetic treatment for a large number of disorders, for which detailed diet sheets were supposed to have an almost mystical therapeutic potentiality.—D. M. Dunlop, Modern Trends in Therapeutic Dietetics, *The British Journal of Nutrition*, Vol. 4, Nos. 2 & 3, 1950.

COUNCIL ON NATIONAL EMERGENCY MEDICAL SERVICE

This paper is one of a series requested by the Council on National Emergency Medical Service to inform the medical profession on problems pertaining to civil defense. It does not necessarily reflect, however, the opinions of the Council or any other official body unless so stated in the article.

C. JOSEPH STETLER, *Secretary.*

RADIOLOGICAL ASPECTS OF CIVIL DEFENSE

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GENERAL CONSIDERATIONS

Should there ever be an atomic attack on this country, the public generally would want something done to ascertain whether there was any danger from radioactive contamination. They would probably not be satisfied unless this were done, and they would probably blame the responsible authorities in local government if it were not done. The assurance that radiological surveys had been carried out, and that they revealed no danger from any residual radioactive contamination, would probably go far toward reducing confusion and perhaps even minimizing that phase of a tendency to panic which may be based on fear of radioactivity.

It is difficult for the person who is not technically trained to understand the phenomena of radioactivity. It is difficult for the average person to visualize the significance of radiological hazards because they are not readily detected by the senses, their presence being made known at the time only by the use of special instruments. Unseen, unheard and not felt, they tend to fall into the category of the "unknown," and fear of the unknown is often more difficult to control than fear of the known. Because of this, and various other factors, the role of radiological safety personnel in the prevention or control of panic could be of vital importance in event of atomic attack. Information they can collect and interpret will have a very important bearing on a variety of problems involving human psychology and human behavior, problems which are of primary concern to the responsible authorities of civil government in event of atomic attack.

Definition of Radiological Defense.—Radiological defense is defined as the protective measures taken to minimize personnel and material damage from radioactivity resulting from enemy attack. As such, it is a planned, organized and directed scheme of "radiological safety" which includes more than simple detection and measurement of radioactivity. It includes as well:

(*a*) Training, organization and distribution of technically qualified personnel.

(*b*) Development and application of techniques and procedures of radiological safety, including the use of instruments for detecting and measuring activity to the end that, as a health protection measure, the existence of residual radiation hazards can be determined and their significance estimated.

(*c*) Development, provision and maintenance of suitable technical equipment.

(*d*) Protection or removal of exposed personnel.

(*e*) Decontamination of personnel, equipment, structures and terrain.

In civil defense, radiological defense is the organized effort of the people, acting under civil authority, to prevent or minimize the injurious effects which may result from the exposure of personnel to residual radioactivity, or "radioactive contamination," which may result from, or arise in connection with, an enemy attack on civil populations.

Radiological defense measures would be particularly directed against the radioactive contamination that might exist after the detonation of an atomic bomb. They would be equally effective, however, if an enemy deliberately employed radioactive materials as an offensive weapon against civilian populations.

Aims of Radiological Defense.—The more specific aims of radiological defense within civil defense are (*a*) to prevent or minimize confusion and panic, through collection and proper dissemination of factual information concerning the existence, or nonexistence, of radiological hazards, (*b*) to prevent or mitigate personnel injuries resulting from exposure to residual radiation hazards, through detection and avoidance of such hazards and (*c*) to facilitate the work of relief and the restoration of essential community services, through the protection of personnel whose civil defense duties require their entry into radiologically hazardous areas.

Some Problems in Radiological Defense.—What are some of the special problems of radiological defense? There are a variety of such problems. Many of these are technical in nature. They are probably the easiest to solve. Others relate to the difficulties of organization and preparation of a special group of civil defense workers and the development of effective civil defense operation schemes. These are probably the most difficult to solve. Still others are intimately related to difficult problems in human relations and in human psychology and behavior.

Requirements in Radiological Defense.—General requirements may be summarized briefly.

A national policy with respect to radiological defense is required and has been established.[1] In line with this policy, a plan or scheme for radiological defense must be prepared in certain states and communities.[2] An organization must be developed to carry out the plan. Qualified personnel will be required to implement the plan. Persons who are proficient in the detection and measurement of radioactivity must be trained to apply these techniques in civil defense and in civil defense operations.

Instruments of the proper type and in appropriate numbers must be procured and made available for radiological defense personnel. These instruments will be needed for training as well as in event of an emergency. Instruments must be carefully selected and suited to the needs and requirements of civil defense activities.[3] Provisions must be made for their issue, storage, maintenance and repair. They must be appropriately dispersed and kept in a state of functional readiness.

Radiological defense personnel will need to be trained to work with personnel in other civil defense activities. They will also be needed to assist in the instruction of workers in other civil defense services, and in the interpretation to them of information concerning radiological safety measures. Some qualified radiological defense personnel will be needed to serve as radiological safety advisers on the civil defense staffs of mayors and governors.

Radiological defense specialists will be required to meet and solve some of the more complicated or "postgraduate" technical and scientific problems which may arise, particularly those associated with the prevention of radioactive poisoning and the evaluation of hazards that may give rise to such poisoning. Qualified radiological defense leaders will be needed to provide for the benefit of the public, reliable information relative to the existence or nonexistence of radiological hazards and to interpret their significance if present.

Ability to cope with atomic disaster will depend in large measure on the state of preparation for civil defense that exists at the time of the attack. This state of preparation, in turn, will depend on the preliminary training that has been conducted, the organization that has been effected and the civil defense forces, including those for radiological defense, which are "in being" at the time of attack.

A general understanding of the phenomena associated with the explosion of an atomic bomb and the effects produced by such an explosion is essential for those directly concerned with radiological defense planning. A technical treatment of those matters,

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This is not an official statement of any agency of the federal government.

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1. United States Civil Defense, NSRB doc. 128, U. S. Government Printing Office, 1950, pp. 67-68.

2. Health Services and Special Weapons Defense, Federal Civil Defense Administration, AG-11-1, U. S. Government Printing Office, Dec. 1950, chap. 17, pp. 178-200.

3. Civil Defense Radiological Monitoring Instruments Specifications, Federal Civil Defense Administration, 1950. Sent to, and available through, state civil defense authorities.

however, does not lie within the scope of this discussion except insofar as may be required later to explain the specific problems in hand.

Radiological defense will employ a technology new to civil defense but one that has been successfully applied in the various atomic bomb tests that have been conducted. It involves intelligent and sound application of technical and scientific knowledge, some, but fortunately not all, of it highly specialized. The radiological defense organization will be composed of technical personnel who have not been medically trained. They will serve a health protection service. In this, they will bear a very important relationship to the medical services and to the broad medical mission of civil defense.

Technical information obtained by radiological defense personnel will permit qualified and specially trained medical officers of the civil defense organization (1) to make a medical evaluation of the situation (2) to interpret the medical significance of such radiation hazards as might be encountered and (3) to evaluate such individual exposures to radioactive contamination as may be required by the mission of the medical services. The Radiological Defense Advisory Committee may, to advantage, serve in the capacity of a Radiation Evaluation Board if this is deemed locally practicable.

While it is desirable for all physicians to have some general knowledge of the purposes of radiological defense and to know in general how the radiological defense mission is accomplished, physicians should not serve as monitors. This would be a serious waste of greatly needed medical personnel. Although not needed in great numbers, some physicians would be required who have had some special training to enable them to serve as advisors in the medical phases of radiological defense. In like manner, scientists and highly trained technical personnel should not ordinarily serve as monitors on radiological defense teams. A limited number of such personnel would be vitally needed, however, to serve on radiological defense "specialists teams" in connection with some tasks which are technically more difficult and more complicated than that of radiological survey work and monitoring.

Qualified radiological defense personnel, possessing level heads and exercising sound judgment, can be of invaluable assistance to civil defense leaders and can do a great deal in the public interest. Careless, or poorly qualified, they can be very harmful to the public interest. This fact and its importance must be recognized at all times. It is essential that radiological defense leaders possess not only sound technical qualifications but a level head and the ability to exercise good common sense as well.

Radiological Defense in Action; Attack and Actions Assumed.—Radiological defense personnel would have a variety of duties. The importance of these duties in relation to civil defense would vary in accordance with the conditions that would be found to exist after an attack. They would also vary somewhat with respect to the time that may have elapsed subsequent to the attack. In most instances it is likely that need for such personnel would be greatest immediately after the attack and perhaps for a day or two thereafter. Should no residual radiological hazard exist, once this fact is known, relatively few radiological defense personnel would be needed in the incident area. They would then be available for other civil defense duties. Should there be a significant residual radiological hazard, the number of personnel required and the duration of the time that they would be required would be greater depending on the conditions encountered.

A clearer understanding of the problems of radiological defense may be developed, if the situation likely to follow an atomic attack be assumed and certain proposed radiological defense measures described.

A. Early Phase, Before Civil Defense Headquarters Is Established: In event of attack, community authorities, in accordance with a prearranged plan, would undoubtedly issue a "call to duty" for civil defense personnel. Radiological defense personnel would report to some suitable and prearranged "reporting in" place (police headquarters, fire headquarters, offices of health departments, training centers in local schools) and await further instructions.[4] Their movement from there into the area of civil defense activity would be in accordance with the needs of those in charge of the civil defense work. Those persons most readily available, and nearest to the incident, would be employed to assist "on the spot" commanders of the police and fire services. Personnel to conduct radiological surveys of the area [5] would probably have to be aided by the police or fire services through their provisions of (1) emergency transportation and escort and (2) emergency communication services. Once at the site of the incident, radiological defense personnel would carry out a radiological survey. If any radiation were detected, it would be measured and the significance of the hazard evaluated. Should radiologically hazardous areas be found, the existence and location of such hazards would be made known to the responsible authority (police) within the area, their specific boundaries would be delimited and their significance indicated. The police, not the radiological personnel, would be responsible for the control of the movement of persons into and out of a hazardous area.

As soon as possible, information relative to the radiological hazards would be communicated to central civil defense control, in accordance with a prearranged plan, preferably through police or fire service communication facilities. On the reliability and availability of this initial information may well hinge the effectiveness of all early phase civil defense operations.

Personnel of the radiological defense organization not engaged in area survey work would be assigned as "service monitors" [6] to accompany working parties of the fire and rescue services. Their duty would then be to remain with these parties, insofar as practicable, to advise them of the severity of the exposures, if any, to which they might be subjected while carrying out their work and to give technical information to "on the spot" commanders essential to the calculation of such risks, with respect to radiological exposures, as might be required. Their aim would be to prevent such injurious overexposures as might not be reasonably justifiable. It would not be to prevent persons from accepting such risks as are justifiable. A practical example may be given. If a serious overexposure could be incurred by a group of men working in a hazardous area for eight hours, a moderate exposure in four hours and an insignificant exposure in two hours, there would be little justification for permitting the eight-hour exposure. A replacement of the group at the end of four hours or earlier would be most desirable from the standpoint of human values and economy of manpower. It would also be practicable even in civil defense work. The requirements of radiological defense must not be intended to prevent exposures that are really necessary. They are to prevent those injurious exposures that are not really necessary.

B. Early Phase, After Central Civil Defense Control Is Established: As soon as a central control of civil defense is able to function with respect to personnel working at the site of the incident, central control could receive emergency radiological reports from leaders of survey personnel via police or fire service communications in accordance with prearranged plan. By this means, the responsible authority in the city would be advised as to the nature, extent and seriousness of radiological hazards present as tentatively indicated by earliest reports of the radiological survey of the area. This is a vital "intelligence" function. Should it be found that no significant or extensive radiological hazards exist, the conduct of fire, police and rescue operations could go on as rapidly as other conditions would permit and without the need of observing radiological safety precautions. Radiological defense personnel would then be held in reserve areas and should not be moved to the area of destruction except as specific need might arise, at which time they would be sent out by authority or direction of the local civil defense commander. The information gained by the radiological survey operations in this early phase would be of great importance to the conduct of civil defense operations after this time. A limited number of radiological survey personnel would continue to make surveys to confirm or alter the earlier estimate of the situation with respect to radiological hazards.

If radiological hazards were found to exist, and if they were of sufficiently serious physiological significance, the civil defense operations might need to be conducted with somewhat

4. At such places instruments for radiological survey could be suitably dispersed and stored so as to be available to the radiological defense personnel when needed. Such a plan would make possible the assembly of personnel at places where teams could be organized and where they could obtain necessary equipment.

5. Vide infra Area Survey Teams, under Organization.

6. Vide infra Service Monitoring Teams, under Organization.

more caution. Life-saving rescue work would undoubtedly be done in most instances regardless of the hazards. The technical information obtained from the radiological survey of areas would provide the basis for the evaluation of the hazard and for the preliminary calculation of the risk that might be incurred. Information of this character would be required (1) for those responsible for directing civil defense activities, (2) for group leaders and (3) for the guidance of the individual civil defense worker.

Personnel of the fire and rescue services, when required to work within the radiologically hazardous area, could be accompanied insofar as practicable, by "service monitors" of the radiological defense organization. They would, in general, be attached to these services at the time, rather than prior to the attack. If so, it would be their duties to measure the exposure of individual working groups and to advise the responsible group leaders, and "on the spot" commanders concerned, as to the nature and severity of the risks being encountered or assumed. Only in exceptional circumstances would it be necessary to report this information back to sector control centers and central civil defense headquarters.

If the radiological hazards were slight, or of no significance or if they were absent, the presence of some radiological defense personnel with these working parties, or at least their ready availability, would do much to aid the morale of the civil defense workers and do much to offset the adverse psychological effects that might be expected.

If there were a significant residual radioactive contamination, such protective services would be of vital importance in the avoidance of important and injurious overexposures of civil defense workers and of other personnel.

C. Later Phases, Under Central Civil Defense Control: Should there be no residual radiological hazards, relatively few radiological defense personnel would be required to continue on duty after the first day or so, although a skeleton organization should probably be maintained, particularly to make checks on areas suspected of being, or rumored as being, radiologically hazardous. If there were significant residual radiological hazard, then the services of the radiological defense personnel might be needed for some days or longer, and an extended radiological safety operation would probably have to be carried out.

During the conduct of the activities just described for the three phases of civil defense operation, it would be necessary to maintain a radiological situation plot in the civil defense headquarters and the main subordinate control centers. On such plot-maps would be charted information concerning the location and the severity of the radiological hazards. This information would be required for the use and guidance of those in responsible authority within the community. Information could be passed from leaders or groups conducting radiological survey in the field to the subordinate control centers by way of police service communications and/or fire service communications, or by such other means as the civil defense plan may provide. Subordinate control centers would communicate with central headquarters.

The police and fire services are normally prepared to utilize all forms of modern communication and have personnel skilled in their use under conditions of disaster. They also have alternate facilities to use if needed, including even motorcyle and foot messenger services. While it would not be practicable to send routine radiological defense information via police and fire service communication facilities, the civil defense plan should, nevertheless, assure the availability of these facilities for high priority and emergency reports.

In the very earliest phases of the incident, the transportation of essential radiological defense personnel up to, and within, the incident area would present a problem that must be provided for in the operation plan. Police or fire forces personnel might be required for escort. It would be necessary to have some workers among the radiological defense personnel who would be concerned with instrument supply, replacement and repair.

Other aspects of radiological defense operations in areas removed from the immediate site of destruction include the problems that may arise in connection with suspected "downwind" air contamination and "fall out" resulting from atomic attack. These will be discussed later.

TECHNICAL CONSIDERATIONS IN RADIOLOGICAL DEFENSE

Radiological Hazards Produced by Atomic Attack.—The detonation of an atomic bomb can, and may, produce two general forms of radiological hazard, the occurrence and importance of which would depend largely on the manner in which the bomb was detonated, that is, whether high in the air as at Hiroshima, near the surface of the ground as in New Mexico and at Eniwetok or under water as at Bikini. There are two general types of radiological hazard which might be created: (*a*) initial radiation hazard and (*b*) residual radiation hazard.

Initial Radiation Hazard.—The initial radiation hazard is created by the prompt radiation of gamma rays and neutrons at the moment of detonation and by the delayed radiation of gamma rays and neutrons from the "ball of fire" immediately after the detonation and lasting for a period of not more than two minutes thereafter. The initial radiation is the severest external radiation hazard created by the explosion of the bomb. The initial radiation hazard produces injury only as a source of external body radiation.

At Hiroshima some persons were by chance shielded by terrain, earthen embankments, heavy concrete walls or similar barriers to gamma radiation. Some who had taken refuge in underground shelters at the time of the air raid warning and who remained there were protected from the injurious ionizing radiations. It is difficult to plan for protection against this radiation hazard. Because protection against the initial radiation hazard is not a function of radiological personnel, this problem will not be discussed in greater detail at this time. It is well, however, to point out that suitable advice relative to this problem is being provided the states by the Federal Civil Defense Administration.

Residual Radiation Hazard.—A residual radiation hazard may, under certain conditions, result from the explosion of an atomic bomb. A hazard of this nature may be due (1) to the presence of fission products that are produced by the splitting of atoms in the bomb explosion and emit beta particles and gamma rays, (2) to the presence of unfissioned bomb material (plutonium) or (3) to the presence of radioactive materials resulting from the bombardment of certain chemical elements by neutrons at the time of, or immediately after, the detonation of the bomb. A residual radiation hazard may cause injury (1) as a source of external radiation or (2) as a source of internal radiation.

Protection against the residual radiation hazards is achieved by the employment of radiological safety measures. The hazards can be detected and their significance evaluated. They can, in large measure, be avoided. The organized and directed activities of radiological defense personnel are aimed primarily at the prevention of injuries from residual radiation hazards.

The gamma radiation from residual contamination can be severe but will not approach the intensity of that of the initial radiation. After the first day or so it would be difficult for one to acquire a severely injurious overexposure to penetrating gamma radiation, or even a dose in excess of 100 of total body radiation.

Radiological Hazards of Various Types of Bomb Bursts.—Air Burst: The detonation of an atomic bomb at the altitude employed at Hiroshima and Nagasaki would produce an intense initial radiation hazard. The bomb would produce the same effects as were observed in the victims at Hiroshima and Nagasaki. The radiation injuries produced in the survivors at Hiroshima and Nagasaki were all due to this form of hazard. Gamma radiation alone was responsible for all radiation injuries that occurred in persons who were more than a few hundreds yards from the center of the explosion area.

After an air burst at a high altitude on a clear day there would probably be no significant residual radiation hazards on the ground, because most of the fission products, and unfissioned bomb material, would be carried to a great altitude by the hot gases resulting from the atomic explosion. They would then be widely dispersed and carried away by the winds at varying levels of altitude with ever increasing dilution. Contamination of air masses, particularly closely downwind of the explosion, might provide some degree of hazard to planes operating therein. Such a condition would probably be transient and might be injurious, depending on a variety of influencing factors. Should radioactive materials from such contaminated air masses "fall out" on the

surface of the ground at sites far removed from the area of the explosion, they would probably create no significant health hazards, although they might be measurable in so-called tracer amounts. Such a situation might give rise to difficult problems in human relations but would probably not be hazardous to health.

Radiological Hazards Produced by Surface and Sub-Surface Bursts: In planning for radiological defense, one cannot entirely disregard the possibility of surface and subsurface bomb detonations.

In a surface burst, the radiological hazards produced at the actual time of detonation would be grossly comparable to those of an air burst, although the range of the radiant heat, flash and blast effects would be noticeably lessened. Persistent radioactive contamination of the ground would be encountered in the immediate target area and for variable distances immediately downwind of the explosion area. It might present a significant radiological hazard, particularly to personnel whose civil defense duties may require entry therein. Contamination of air masses would be much the same as that resulting from an air burst. In addition, there might be some contamination of nearby land surfaces as a result of heavy "fall out" and as a result of spread of ground contamination through surface drainage and movement of subsurface waters. Any distant downwind contamination attributable to cloud "fall out" would probably not constitute a significant health hazard of any kind, and it is unlikely that it could ever be the source of radioactive poisoning from the inhalation or ingestion of contaminated materials.

Should the bomb be detonated beneath the surface of a body of water, under the same conditions as in the second Bikini test, the radiological effects would probably differ widely from those produced by surface or high altitude explosions. Under these circumstances, the radiations released at the instant of detonation may largely be absorbed by the water and so be rendered of minor importance. On the other hand, contamination of air masses, though relatively limited in extent, may be of considerable severity. Nearby land areas and above-surface objects in the path of the "base-surge" and the "radioactive rain" which would accompany it, as well as the body of water itself, would doubtless be heavily contaminated with radioactive fission products. This contamination would persist for variable periods of time, depending on the rate of radioactive decay, dispersion and dilution and other factors. The significance of such a residual contamination could be determined only after analysis of the situation by qualified radiological defense personnel employing techniques now well established in practice.

"Fall Out": When the radioactive, metallic oxide particles in the bomb cloud collide with the particles of dirt, which are in general considerably larger, they adhere and the dirt particles in the cloud become contaminated with the radioactive substances. Then, when the violence of the disturbance due to the explosion has subsided, the contaminated dirt particles gradually fall back to earth, giving rise to the phenomenon known as "fall out." If the height of the bomb burst exceeds a certain value, there will probably be no detectable "fall out" since no extraneous particles will be sucked into the cloud. However, should the bomb be detonated relatively close to the ground, or on the surface of the ground, and considerable amounts of dirt and other debris were sucked into the radioactive cloud, the "fall out" would have to be considered as a danger until proved otherwise. Much the same situation would exist if the bomb were detonated at a low level above the surface of water, although then the "fall out" would consist mainly of water drops. In an underwater burst, detectable, but probably not dangerous, "fall out" might occur at a considerable distance from the site of the explosion. In an underwater burst, the really significant "fall out" would be that closely associate with the "base surge" and "radioactive rain" created by such an explosion, and this would be observed for variable distances immediately downwind of the explosion.

"Base Surge" and "Radioactive Rain": In the underwater test at Bikini a "base surge" and a "radioactive rain" were observed for the first time. Together they were responsible for the surface contamination that was observed within a radius of a few thousand yards downwind of the explosion. For a technical discussion of these two important and somewhat complicated phenomena, "The Effects of Atomic Weapons" [7] should be consulted.

Significance of Problems of Food Contamination in Civil Defense.—Foodstuffs from storage places, markets, restaurants or food-processing plants within the areas of residual contamination should be suspected of being contaminated and should be monitored before being used. Nonperishable foods found to be contaminated should not be destroyed until monitored by special radiological defense teams and they advise disposal.

After an atomic explosion, within the areas of residual contamination, foods in undamaged refrigerators, cans, bottles, jars and sealed packages may be used without monitoring, provided care is exercised in washing off any dust or liquid from the outside of the container or package before opening and precautions taken to prevent contaminated materials from getting into the food during the process of opening the container or removing its contents.

Under most unusual conditions certain risks might be encountered in the long-continued and repeated ingestion of animal or plant forms that take up radioactive elements from the environment and concentrate them within their own bodies. The control of such a problem would, however, not be difficult, and the medical specialists in radiological defense would be alert to the detection and evaluation of such an unusual situation.

Significance of Problems of Water Contamination in Civil Defense.—Contamination of water would not be a problem after an aerial burst such as at Hiroshima and Nagasaki.

The Bikini underwater test provided the ideal situation for maximum water contamination—it was a particular type of underwater burst, occurring in a deep body of salt water which is stagnant in nature and in which the exchange of water in and out is actually very small. Under these conditions, the radioactive contamination within the water tended to remain confined to the water, the bottom and the biological forms within that body of water. There was a considerable natural shifting of radioactively contaminated materials within this lagoon, and a potential hazard may have persisted with respect to food forms taken from it.

The hazard that might be created in rivers, lakes and harbors would vary, depending on the depth of the water at the site of detonation and the size of the body of water, the rapidity of exchange as a consequence of current, tide or otherwise and, of course, the magnitude of the original contamination. These are some of the technical matters to be considered in relation to a potential hazard of this nature. They would be of primary concern to "specialists teams" of the radiological defense organization, rather than to "area survey" monitors.

It now appears that the civil defense problems associated with exposures to internal radiation hazards of this nature and which are of relatively short duration (hours, days) are probably not as formidable as was once feared. The more complicated and possibly more serious problems would center around long-continued or repeated exposures through the drinking of contaminated waters or the eating of food forms derived directly, or indirectly, from waters so contaminated.

Modern municipal filtration systems, in those cities where these facilities exist, would provide a great deal of protection through their ability to remove such contamination. It would be possible to keep a close check on this matter at the filtration plants, and when required the contaminated materials of the filtration system could be replaced. The problem is one not too difficult to deal with technically, even in the most extreme conditions visualized. This problem would be of primary concern to specially trained public health radiological defense teams, rather than to area survey monitors.

The process of distillation, as employed in the nontarget ships at Bikini after the underwater test, effectively removed the radioactive materials by holding them in the evaporator. This provides substantial evidence as to the efficacy of this procedure in decontaminating water under the extreme conditions of contamination that characterized that test.

In this connection, it must be pointed out that radioactivity in measurable amounts does not necessarily mean radioactivity

7. The Effects of Atomic Weapons, Atomic Energy Commission and Department of Defense, Government Printing Office, Dec. 1950.

in injurious amounts. In the use of radioisotopes in medical diagnosis small amounts of radioactive materials, much too small to produce any injury, are employed in so-called tracer amounts. Radioactive contamination of water from anything but a Bikini type underwater burst would probably be of much the same significance. While it would be detectable, measurable and of technical interest, it is not likely to be of practical significance from the standpoint of causing injury to personnel except possibly as a result of prolonged and repeated ingestion of contaminated water or food products derived therefrom.

The techniques of study of such water would be much the same as those now in use in biological and medical laboratories where water is tested, and in those medical laboratories where the blood and urine of patients treated with radioisotopes is measured and studied. Similar techniques could be employed effectively to protect personnel from this form of hazard were it ever encountered. This would be done by special public health teams or "specialists teams' of the radiological defense organization, rather than by "area survey" monitors.

Water containing one-millionth of a curie of fission products per liter is considered safe for drinking. Many popular mineral waters contain more than this.

Some cities, such as New York, obtain their water supplies from sources removed from the city proper. In such circumstances the problems of providing safe water for drinking and household purposes would probably not be difficult or serious. Many cities do not have filtration facilities, so that the problems may require special consideration.

Decontamination Measures.—As used in radiological defense, decontamination means the removal of radioactive materials from the person or object contaminated with such materials. It does not consist of changing the rate of decay of the radioactive elements present. By moving the radioactive materials from one place to another, either partially or completely, one may serve a useful purpose or may simply shift the site of hazard from one place to another. The dispersion of radioactive materials in air or water, and on land surfaces, may reduce the amount of contamination at a particular site. It may, however, give rise to new problems at other sites. Generally, such dispersion, and the accompanying dilution tends to favor the protection of personnel. This is the active factor, which in association with "radioactive decay," constitutes nature's way of decontamination. There are a few important exceptions to this generalization. Under certain conditions, biological forms may tend to concentrate radioactive substances and a rather subtle and perhaps significant radiological hazard may develop where it is not expected.

Decontamination procedures as they apply to extensive land surfaces and buildings, and perhaps to a lesser extent to some large items of equipment, have not proved to be entirely satisfactory. On the other hand, it is possible to remove contamination from the external surfaces of the human body through the removal of contaminated clothing combined with a thorough washing and rewashing of the face, hands and body with soap and water. This is both practical and effective. It should be a routine procedure for personnel required to work in contaminated areas.

Small objects the surface of which are nonporous or nonabsorbent, may often be decontaminated by somewhat similar techniques. In certain circumstances, weak acids or other chemicals may be employed to advantage. Generally such materials as are absorbent are not readily, if at all, decontaminated. Wood, concrete, asphalt, soil and certain organic materials can rarely be decontaminated successfully.

Clothing will tend to prevent radioactive materials from coming into contact with the skin. In this sense only, may clothing be considered as being protective. When the contaminated clothing is removed, one phase of personal decontamination is carried out. When the contaminated clothing is being worn, and the radioactive material is not in direct contact with the skin, the beta particles or alpha particles emitted will usually not injure the skin although the gamma radiations emitted will penetrate the clothing and may produce injury.

The Armed Services Chemical Warfare Masks will prevent inhalation of radioactively contaminated materials and, when required, can be employed for this purpose by personnel who are working in contaminated areas and by those engaged in certain decontamination operations.

Exposure Tables.—In the atomic energy program, a standard has been set, called the "permissible dose" or "tolerance dose." This stipulates an exposure to the entire body that a man could experience every day in his life without danger of injury. This has been set at a maximum of 0.1 r a day with a weekly maximum of 0.3 r.

This applies to daily exposures. It is a very different matter when applied to a one-time exposure in emergency and to that accumulated in a period of a day or so. Under these conditions a person may be subjected to many times the daily "permissible dose" without injury.

In emergency civil defense operations and with exposures incurred within a few days the following points would obtain:

1. A person could probably be exposed to 25 to 50 r of total body radiation without incurring injury and be able to continue at his duties. If possible, he should not be exposed to any more radiation, at least not for several weeks. The Atomic Energy Commission has recommended to the Federal Civil Defense Administration that workers not be exposed to more than 25 r, and this recommendation should be followed.

2. A person exposed to 50 to 100 r of total body radiation might have some nausea and some changes in the number of cells in his blood, but he would most likely be able to continue his duties. Such exposures should most certainly be avoided if possible, and the individual should not be exposed to any more radiation, at least for many weeks.

3. A person exposed to 100 to 200 r might be incapacitated after the injury suffered began to take effect—probably some hours after exposure. He should not be exposed to any more radiation. It would be difficult to acquire exposures of this magnitude after the first day as a consequence of residual radiation hazards.

4. Exposures in excess of 200 r would in most instances produce "noneffectives," as injury and some degree of disability are practically certain.[8]

The interpretation of the medical significance of various levels of exposure to radioactive contamination is a function of the medical services rather than of the technical personnel of radiological defense. In the absence of medical personnel, monitors and technical personnel of the radiological defense organization would interpret their findings in accordance with the standards just described.

Exposure standards for other than penetrating gamma radiations lie beyond the technical scope of the present discussion.

It should be pointed out at this time that it is not the function of radiological defense monitors to determine, for purposes of medical diagnosis or treatment, the amount of exposure to radiation that individual casualties might have received during the period of initial radiation. Should it be deemed advisable to estimate the amount of radiation that might have been received by persons who were exposed in the open within certain ranges of the center of physical destruction, this should be done by technical and medical specialists on the staff of the civil defense headquarters, and not by monitors.

Types of Instruments Required for Technical Procedures.—The principal types of radiological defense equipment required for local operations are as follows:

Survey Meters: These instruments (Geiger counters and ionization chambers) are used to detect and to measure ionizing radiations, principally gamma radiation. Usually they measure the amount of radiation per unit of time, in which case they may be referred to as "rate meters." The requirements for these instruments will vary from a relatively large number of high intensity gamma ray monitoring instruments and a lesser number of low intensity gamma survey meters to a relatively small number of instruments that can detect alpha and beta particles at low intensities or in small amounts. The high intensity gamma survey meters should cover a range from 0.025 to 500 r per hour. The low intensity gamma survey meters are suitable for training purposes also. Specifications for civil defense monitoring instruments have been issued by the Federal Civil Defense

8. For additional information on this problem see The Effects of Atomic Weapons,[7] table 11.28, page 342; figure 8.16, page 253; figure 8.17, page 254, and table 8.10, page 251. Also, Health Services and Special Weapons Defense, Federal Civil Defense Administration, Government Printing Office, Dec. 1950, p. 12.

Administration for the guidance of users and manufacturers.[9]

Dosimeters or Cumulative Dosage Indicators: These instruments (primarily special purpose electroscopes) are used to measure the total amount of exposure that has taken place over a particular period of time. They are worn by monitoring personnel to measure the total amount of radiation to which they have been exposed. With some dosimeters, the amount of the exposure may be read directly in the dosimeter. With others, the exposure is read indirectly by the use of a second instrument. The direct reading type is probably the most desirable for most civil defense purposes. Recently some simplified dosimeters have been developed that depend on the effects of ionizing radiations on a chemical indicator, or a special film preparation.

Other Laboratory Type Equipment: Other types of special equipment, of a laboratory nature, might be required for particular purposes. These will include counter scaler instruments with special alpha detectors, low intensity beta-gamma survey meters, portable alpha proportional counters, air filters, and sample preparation equipment and other instruments and accessories. It is not fitting at this time to more than mention that such equipment is available and could be readily procured if the need for such were known to exist. Such instruments are not needed in great quantities, or in such urgent haste, that they could not be readily provided from existing sources of supply and storage. Many items of equipment presently in use in radioisotope laboratories are well suited to this purpose.

Photographic Dosimetry: Photographic film badges may be worn by a person to measure the amount of external body radiation to which he is exposed. When the film is developed and compared with proper standards, the exposures can be measured. It is likely for both technical and operational reasons, that the use of such devices will be less suited to civil defense needs than in somewhat comparable situations in industrial plants and laboratories in which there are penetrating ionizing radiation hazards.

The issue, collection, development and measurement of film badges under conditions of civil defense requirements would take up too much time and effort to be practicable. Record keeping and the need for notification of involved personnel would be further hampering. While the use of such film badges would not be generally applicable to civil defense workers, under certain conditions associated with the persistence of a significant residual radiological hazard their use, on a limited scale, may be highly desirable and also practicable.

ORGANIZATION

Personnel.—The radiological defense organization will be manned by part time volunteer workers who will not receive pay for their services. They will be trained in the technical and operational aspects of their duties as part of the civil defense training program. They will not have had medical training and will frequently need advice from those who have had, because their function is primarily one of health protection and there are many medical implications associated therewith.

Monitoring Teams.—The backbone of the working organization will be the monitoring team. The composition of a typical monitoring team as suggested by the Federal Civil Defense Administration would be one "leading monitor" and two monitors equipped and qualified to discharge the duties assigned to them. They would be aided by three "assistants" who have not had special technical training but who have been trained to assist the monitors. To provide flexibility in assignment and discharge of duties, all monitors should be trained to serve either in "area survey operations" or in "service monitoring."

Area Survey Teams.—When assigned to the radiological monitoring of areas suspected of being contaminated, the monitoring teams will serve as "area survey teams."

Service Monitoring Teams.—When assigned to the monitoring of civil defense personnel working in potentially radiologically hazardous areas they will serve as "service monitoring teams."

Specialists Teams.—To solve some of the technically more difficult tasks, such as those involving radiochemical analyses, and to meet some of the other problems which require the services of trained and experienced specialists, a limited number of "specialists teams" may be required.

Headquarters Group.—A limited number of personnel will be needed to man the plotting rooms in civil defense headquarters and to assist in the direction of the activities of the monitoring teams. In addition, some personnel will be required to assist in the supply and maintenance of monitoring instruments.

Operations.—To function as a smooth-working civil defense service, there must be a proper organization and a suitable operation plan, both well integrated into the civil defense scheme of the community. The activities of the monitoring teams must be directed and they must be carried out according to a prearranged plan insofar as this is possible. Otherwise, there will be added confusion, and the mission of the health services of civil defense will not be attained. In the planning of the radiological defense operations leadership, patience and good common sense will be required. Where those in charge of radiological defense understand the missions and tasks of those persons in the other civil defense services, and when they in turn understand the mission of the radiological defense personnel, an effective cooperative scheme of operations can be effected. It cannot be done otherwise.

TRAINING

Radiological Defense (Monitors).—The Federal Civil Defense Administration has encouraged the establishment of courses for radiological monitors within the states. Such courses emphasize the practical aspects of the detection and measurement of radiation. They also stress the use of these techniques in civil defense operations. By limitation of the scope of the technical tasks to which monitors may be assigned, it has been possible to train personnel with a good general background of education to the level of proficiency that would be required in the discharge of "area survey" and "service monitoring" duties. Approximately one year ago, the Atomic Energy Commission provided leadership and assisted in the setting up of such training in many of the states. Leaders, trained in these courses, are now assisting in the conduct of similar courses of basic instruction within their states.

Medical Aspects of Radiological Defense.—The training of selected physicians, especially radiologists, in the medical aspects of radiological defense and in the medical problems associated with the possibility of a residual radiation hazard will be developed more actively in the future. These persons would then, as representatives of the medical services, act in the capacity of medical advisers in relation to the radiological defense services. There are a variety of problems requiring special attention at the hands of medical personnel who possess special knowledge in this new field of medical responsibility. The Atomic Energy Commission assisted in the conduct of some such courses this past year, and the instruction was of an intensive nature and at the postgraduate level.

Medical Aspects of Atomic Warfare.—It is generally recognized that all physicians and nurses should have some orientation instruction in the medical aspects of atomic warfare. The purpose of this instruction is to acquaint them with the medical and health problems that are peculiar to atomic attack, rather than to enable them to serve as medical or health advisers with respect to the more complicated technical aspects of radiological defense. An orientation course of this character can be satisfactorily conducted even when limited to only eight to 12 hours of actual instruction. Already, a great many classes of this character have been held, the instruction usually being given by persons who had attended courses given by the Atomic Energy Commission or the armed services. The purpose in describing this phase of instruction at this time is to point out its relation to the two courses that have just been described. It is important that the specific training objectives for a particular course of instruction be kept in mind when considering the planning of programs of instruction. Whereas as many physicians as possible should receive the orientation course in the medical aspects of atomic warfare, relatively few would need to attend the longer course in the medical aspects of radiological defense.

The Council on National Emergency Medical Services will cooperate closely with the Federal Civil Defense Administra-

9. Civil Defense Radiological Monitoring Instruments Specifications, Federal Civil Defense Administration, Dec. 6, 1950. Available in state civil defense offices.

tion in appropriate fields of medical training. State medical associations may be called on to participate actively in the planning and conduct of such instruction within their respective states.

CONCLUSION

It has been my purpose to present an over-all picture of a new problem that is closely related to the responsibilities of the medical profession of this country. The need for a radiological safety scheme within civil defense is described, and many of the technical considerations involved are presented. The problems of organization and training are discussed only in order that attention may be directed to certain basic concepts of concern to the medical profession.

The medical profession has a special responsibility in matters of health protection even in civil defense. As physicians, we have a civil responsibility to know something about the problems associated with the possibility of residual radioactive contamination created by an enemy attack on civilian communities. In relation to these matters, we will be called on over and over again to give advice. As a profession, we have a particular appreciation of not only the medical but also the psychological problems involved. We can help to interpret them to our fellow men. It is in the national interest that we be as well prepared and as well informed as possible in order that we can fulfil our obligations in this respect in the best possible manner.

COUNCIL ON PHARMACY AND CHEMISTRY

The Council has authorized publication of the following report from the Committee on Research, a Standing Committee of the Council on Pharmacy and Chemistry.

R. T. STORMONT, M.D., *Secretary.*

Previous publications [1] by the Subcommittee on Steroids and Cancer of the Committee on Research have discussed the background of the problem of estrogen and androgen treatment of mammary cancer, outlined the procedures used in the current cooperative study sponsored by the Committee, and presented certain preliminary data obtained in this investigation. Details of some of the cases studied by participating investigators have also been published.[2] This report, prepared during the incumbency of Walton Van Winkle, Jr., as secretary of the Committee on Research, presents the Subcommittee's recommendations on the selection and treatment of patients with advanced mammary cancer and part of the data on which these recommendations are based. Ira T. Nathanson, Chairman; Frank E. Adair; Willard M. Allen; Earl T. Engle; Charles Huggins.

PAUL L. WERMER, M.D., *Secretary.*

CURRENT STATUS OF HORMONE THERAPY OF ADVANCED MAMMARY CANCER

MATERIAL STUDIED

Although records on more than 1,200 cases of mammary cancer treated with steroid hormones have been submitted to the Committee, only 886 cases have been included in the tabulations presented in this report. These cases were selected on the basis of the following criteria:

1. The diagnosis of mammary carcinoma was established by microscopic examination of tissue obtained at biopsy or operation or on the basis of other criteria such as roentgen evidence of pulmonary or osseous metastases.

2. The patient had very advanced primary, recurrent or metastatic disease not suitable for therapy by surgery or irradiation.

3. The patient had not been irradiated or castrated within the six-month period immediately preceding hormone therapy.

4. Roentgen ray therapy was not administered during hormone therapy, the patient was not castrated during therapy, nor was more than one hormone given during the period of observation.

5. The patient received treatment for at least four weeks.

6. Hormones were administered in accordance with the protocols established by the Committee.

7. All pertinent data on each case was recorded on the forms provided by the Committee.

The following is a tabulation of the number of patients receiving each of the hormones studied.[3]

	No. of Patients
Testosterone propionate (four schedules)	441
Methyltestosterone (200 mg. daily by mouth)	17
Diethylstilbestrol (15 mg. daily)	231
Ethinyl estradiol (3 mg. daily)	53
Premarin ® (30 mg. daily)	35
Estradiol diproprionate (5 mg. twice weekly)	21
Dienestrol (15 mg. daily)	24
Dimethyl ether of diethylstilbestrol (30 mg. daily)	35
Progesterone	11

A number of patients received the following compounds but the data are yet too limited for evaluation:

Methylandrostenediol
Testosterone cyclo pentenyl propionate
Monomestrol
Tri-para-anisyl-chloroethylene

Some patients received more than one hormone, although not simultaneously. In such instances, each period of hormone administration is regarded as a separate case. The data in table 1 justify this procedure, as far as this analysis is concerned. Whether previous hormone therapy may effect the patient's subsequent response in manner is not revealed in the present study.

The differences observed between the responses of patients who had received treatment and those previously treated with one of the hormones are within the statistical limits of error and hence are not to be regarded as significant for the number of cases observed.

SELECTION OF CASES

It must be emphasized that hormone therapy of mammary cancer is palliative only and not curative. Therefore, early diagnosis and removal by surgery remain the primary modes of attack on mammary cancer. In the presence of distant metastases, two forms of palliation are available: roentgen therapy and hormone therapy. A comparison of these forms of therapy has recently been made by Garland and his coworkers.[4] On the basis of these and other data, the Committee recommends that in the presence of localized and accessible osseous or soft tissue metastases surgery be performed whenever possible or adequate roentgen therapy be administered in

1. Estrogens and Androgens in Mammary Cancer, Council on Pharmacy and Chemistry, J. A. M. A. **135**: 987 (Dec. 13) 1947. Estrogens and Androgens in Mammary Cancer, A Progress Report, Council on Pharmacy and Chemistry, J. A. M. A. **140**: 1214 (Aug. 13) 1949. Van Winkle, W., Jr.: Action of Steroid Hormones in Mammary Cancer, Radiology **53**: 530, 1949. Proceedings of the First Conference on Steroid Hormones and Mammary Cancer, American Medical Association, Chicago, April 4-7, 1949.

2. Talbot, T. R., and Escher, G. C.: Effects of Testosterone Propionate on the Peripheral Blood and Bone Marrow of Women with Advanced Inoperable Carcinoma of the Breast, J. Clin. Endocrinol. **9**:666, 1949. Taylor, S. G.; Slaughter, D., and Preston, F. W.: Treatment of Far-Advanced Inoperable Carcinoma of the Breast with Androgen and Estrogen, J. Clin. Endocrinol. **8**: 585, 1948. Huseby, R. A.: A Note Concerning the Selection of Therapy for Cases of Advanced Breast Carcinoma Involving the Bony Skeleton, Bull. Univ. Minnesota Hosp. **20**: 288, 1949. Huseby, R. A., and Arhelger, S. W.: Estrogen Therapy of Advanced Cancer of the Female Breast, Bull. Univ. Minnesota Hosp. **20**: 276, 1949. Cutler, M.; Schlemenson, M.; Kearney, V. V., and Caceus, E.: The Treatment of Advanced Mammary Cancer with Estrogens, Surgery **26**: 567, 1949. Cutler, M., and Schlemenson, M.: Treatment of Advanced Mammary Cancer with Testosterone, J. A. M. A. **138**: 187 (Sept. 18) 1948. Adair, F. E., and others: Use of Estrogens and Androgens in Advanced Mammary Cancer: Clinical and Laboratory Study of 105 Female Patients, J. A. M. A. **140**: 1193 (Aug. 13) 1949. McCullagh, E. P.: The Use of Sex Hormones in Cancer, Cleveland Clin. Quart. **16**: 21, 1949. Preston, F. W.; Taylor, S. G., and Crumrine, J. L.: The Effect of Testosterone Propionate on Metastases to Bone from Carcinoma of the Breast, J. Clin. Endocrinol. **9**: 1314, 1949. Macdonald, I., and Guiss, L. W.: Palliative Management of Mammary Carcinoma, California Med. **69**: 144, 1948. Nathanson, I. T.: Hormonal Treatment in Cancer, M. Clin. North America **34**: 1409, 1950. Nathanson, I. T.: Hormones in Relation to Tumors of the Female, in Meigs, J. V., and Sturgis, S. H.: Progress in Gynecology, New York, Grune & Stratton, 1950, vol. 2, p. 218. Nathanson, I. T.: Hormone Therapy in Cancer of the Breast, Soskin, S.: Prog. Clinical Endocrinology, New York, Grune & Stratton, 1950, p. 567.

lieu of hormone therapy. In the presence of widespread osseous or soft-tissue metastases, or lung metastases, hormone therapy is often preferable as the primary therapeutic weapon.

Physiologic Age of Patient: Early investigators observed that the menopausal status of the patient apparently affected the results of hormone therapy, particularly the response to estrogens. The data obtained by the participating investigators in the Committee-sponsored investigation is shown in chart 1. These data indicated that the presence or absence of functioning ovaries probably has little significant effect on the response to testosterone propionate. However, it is apparent that postmenopausal women respond far better to the estrogens than do premenopausal women. Further analysis of the data reveals that the greater the number of years past the menopause the more likely is a satisfactory response to estrogen therapy. This is well illustrated in Chart 2 where the per cent of patients showing regression of soft tissue lesions is plotted according to the age of the patient. In general, the best results from estrogen therapy are obtained in patients more than five years postmenopausal.[5]

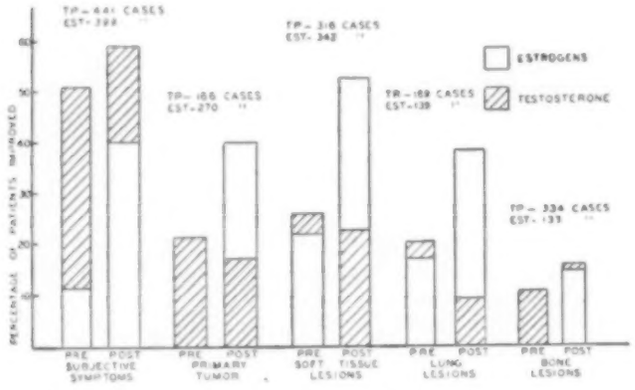

Chart 1.—Relation of menopausal status to response to hormones.

To further emphasize the importance of withholding estrogens from premenopausal patients with mammary cancer it should be mentioned that all of the patients who showed acceleration of their disease following estrogen therapy were in the premenopausal group or were in the menopause.

Choice of Hormone: It is obvious from Chart 1 that the hormone of choice for the premenopausal patient is testosterone propionate. In the postmenopausal patient with soft tissue lesions, estrogens appear to be far superior in producing an objective response than testosterone propionate. Where bone lesions predominate, there is little difference between response to estrogens and to testosterone propionate. However, since bone lesions are frequently the source of severe pain, and since testosterone appears to be superior to the estrogens in relieving subjective symptoms of the disease, most investigators prefer to use testosterone propionate in the treatment of osseous metastases.

Table 2 compares the values of the six most studied estrogens in the treatment of metastatic mammary cancer. According to these data ethinyl estradiol is slightly superior to the other estrogens. This superiority may be more apparent than real; however, since larger doses of other estrogens may be more efficacious than those used in this investigation, the difference in response might then disappear.

Unfortunately, the number of patients treated with methyltestosterone or methylandrostenediol has not been sufficient to permit valid comparisons with patients treated with testosterone propionate. In general, however, the dose of methyltestosterone employed has produced responses identical with responses to testosterone propionate. Methylandrostenediol, on the other hand, has not produced any satisfactory responses in the four patients in whom it has been used, with one possible exception.

The available data concerning progesterone are likewise fragmentary. Only one patient of the eleven treated showed any subjective improvement and one showed evidence of regression of soft tissue and bone lesions following progesterone therapy. One patient showed acceleration of soft tissue disease while receiving progesterone.

Location of Lesion: The distribution of metastases according to site and the response of these metastases to hormone therapy is shown in table 3. It is apparent, in the case of bone metastases, that the site of the lesion does not materially influence the response, although the data suggest that skull lesions may tend to respond more frequently than other bone metastases.

Among the soft tissue lesions, intra-abdominal metastases appear to respond least and, in estrogen-treated patients, skin and lymph node lesions respond most frequently. The apparent lack of response of abdominal lesions may be due to obvious difficulties in measuring or examining such lesions. In the testosterone-treated patients the response of skin and lymph-node lesions is not significantly greater than the response of other soft tissue lesions.

DOSAGE OF HORMONES

Testosterone Propionate: Four dosage schedules of testosterone propionate were explored. On all schedules, the weekly dose was given in three injections. Responses to the various dosage schedules are shown in Chart 3. The difference between the responses to the lowest dosage schedule (75 mg. weekly) and the highest (600 mg. weekly) is not significant. There is a suggestion that a dosage of 150 to 300 mg. weekly given in three divided doses may be optimal, but in this study 150 mg. weekly appeared to be as effective as 300 mg. weekly.

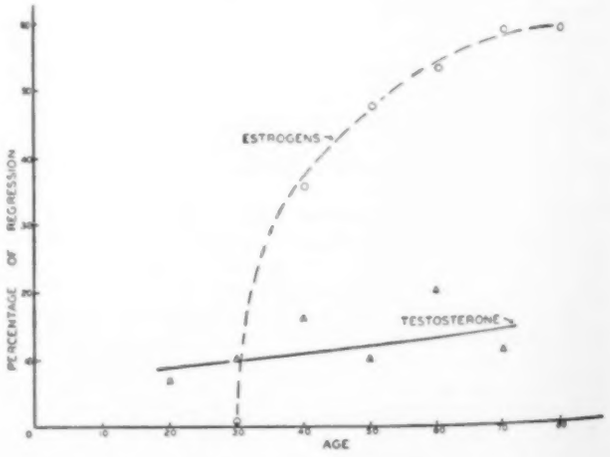

Chart 2.—Soft tissue lesion response.

It was not possible to determine the total dose at the time improvement began. Determination of the time of onset of improvement is subject to error, being dependent upon such factors as the frequency with which patients are seen by the physician and the frequency with which roentgenograms are taken. However, a crude measure of the relation of response to

3. The following pharmaceutical houses generously donated the hormones used by the investigators:
Abbott Laboratories: diethylstilbestrol, progesterone
Ciba Pharmaceutical Products: testosterone propionate, methyltestosterone ethinyl estradiol, estradiol dipropionate
Ayerst, McKenna & Harrison: Premarin, progesterone
Charles E. Frosst (Canada): testosterone propionate, dienestrol, diethylstilbestrol
Lakeside Laboratories: diethylstilbestrol
Wm. S. Merrell Co.: tri-para-anisyl-chloroethylene
Organon, Inc.: estradiol dipropionate, ethinyl estradiol, methylandrostenediol, methyltestosterone, testosterone propionate
Rare-Galen, Inc.: testosterone propionate, dienestrol
Schering Corp.: testosterone propionate, estradiol dipropionate, ethinyl estradiol, methyltestosterone
Schering Corp., Ltd. (Canada): ethinyl estradiol, testosterone propionate
E. R. Squibb & Sons: diethylstilbestrol, progesterone
Upjohn Co.: diethylstilbestrol, progesterone
Wallace & Tiernan Products: dimethyl ether of diethylstilbestrol, monomestrol
White Laboratories, Inc.: dienestrol
Winthrop-Stearns, Inc.: diethylstilbestrol

4. Garland, L. H., and others: Roentgen and Steroid Hormone Therapy in Mammary Cancer Metastatic to Bone, J. A. M. A. 144: 997 (Nov. 18) 1950.

5. Nathanson, I. T., in Proceedings of Laurentian Hormone Conference, American Association for the Advancement of Science, Franconia, New Hampshire, Sept. 10-15, 1950, to be published.

total dose may be obtained from the data submitted to the Committee by comparing the incidence of favorable response to total dose in this large group of patients. Inspection of the data revealed that only 6 per cent of the patients who received less than 3 Gm. of testosterone propionate responded favorably, in contrast to about 20 per cent of those who received 3 Gm. or more. Subjective improvement was twice as frequent among patients who received 2 Gm. or more as among those who received less than 2 Gm.

It should be remembered, however, that the total dose is a function of the duration of treatment, and the data presented below suggest that duration of treatment is of greater importance than the total dose administered.

Estrogens: Dosage schedules of the various estrogens were not varied in this investigation. The doses used were ones known to produce an effect, but as yet there are no data indicating that these doses are optimal. The four estrogens given in daily doses of 15 to 30 mg. showed approximately the same degree of potency. Patients who received less than 2 Gm. total dose showed only 15 per cent subjective improvement, whereas those receiving 2 Gm. or more showed slightly more than 50 per cent subjective improvement. Objective improvement was

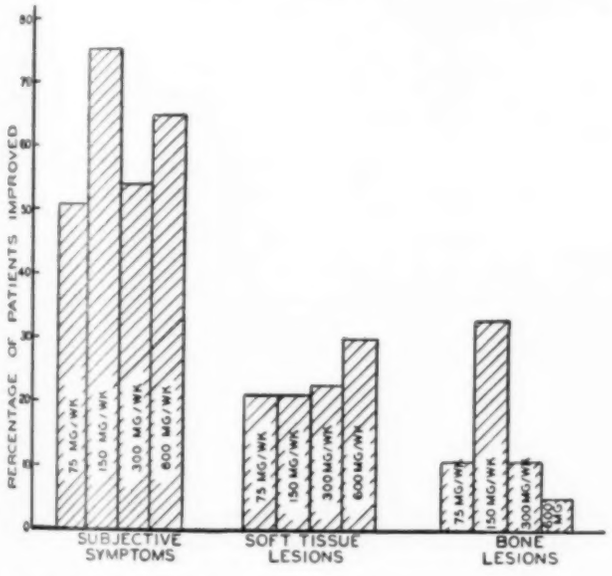

Chart 3.—Relation of dosage schedule of testosterone propionate to favorable response.

twice as frequent in patients given 4 Gm. or more as in those given a total of less than 4 Gm. Again, duration of treatment is probably more important in determining the outcome of therapy than the total dose administered.

Ethinyl estradiol and estradiol dipropionate, because of their higher biological potency, were given in doses much smaller than those of the other estrogens. A total dosage of 200 mg. appeared to be minimal for a satisfactory response in about 75 per cent of the patients who exhibited objective improvement.

Methyltestosterone: Although only 17 patients were treated with methyltestosterone, the incidence of favorable response in patients receiving a total dose of 30 Gm. was between two and three times that in patients receiving less than 30 Gm. This figure is interesting because the weekly dose of methyltestosterone was five times the reference dose of testosterone propionate (300 mg. weekly) but the minimal total dose of methyltestosterone appears to be ten times that of testosterone propionate. The minimal duration of treatment with methyltestosterone is nearly twice that of testosterone propionate; thus, the difference in length of treatment corroborates the difference observed in minimal total doses.

DURATION OF TREATMENT

Testosterone Propionate: Although it was not possible to determine the exact time of onset of improvement in treated patients, the incidence of improvement was approximately twice as great in patients treated for more than three months than in those treated for a shorter time. This difference obtained under all dosage schedules, which suggests that although the total dose is important, the duration of therapy is equally or perhaps more important. A patient given 150 mg. weekly receives about 2 Gm. of testosterone propionate in a three month period and a patient given 300 mg. weekly receives about 4 Gm. in a three month period. These two dosage schedules were the ones showing the best responses.

It should always be emphasized that these data only indicate a *minimum* treatment period and no effort has been made to determine the optimal or maximal duration of therapy. If a patient has not responded after three months and a total dose of 3 Gm., it is not likely that response will be obtained by further treatment.

TABLE 1.—*Relation of Prior Treatment to Subsequent Hormonal Response*

Prior Treatment	% of Subjective Improvement		% of Soft Tissue Regression		% of Bone Lesion Regression	
	Testosterone	Estrogen	Testosterone	Estrogen	Testosterone	Estrogen
None	50	39	24	53	13	18
Hormones	53	42	20	44	22	no cases

TABLE 2.—*Responses of Patients with Mammary Cancer to Six Estrogens*

Estrogen	Subjective Relief %	Primary Tumor Regression %	Soft Tissue Regression %	Lung Lesion Regression %	Bone Lesion Regression %
Diethylstilbestrol	39	42	53	29	14
Ethinyl estradiol	59	45	67	43	10
Premarin ®	35	45	44	8	16
Estradiol dipropionate	30	50	45	12	*
Dienestrol	46	13	42	17	*
Dimethyl ether DES	34	32	47	19	*

* Insufficient cases.

TABLE 3.—*Response of Specific Metastatic Lesions to Testosterone Propionate and Estrogens*

Site of Metastasis	Testosterone		Estrogens	
	No. of Cases	Regressed, %	No. of Cases	Regressed, %
Bone				
Skull	79	19	32	20
Vertebrae	199	14	55	17
Ribs	134	14	50	15
Pelvis	179	13	45	11
Femur	108	11	36	7
Clavicle	23	11	14	0
Scapula	27	14	7	14
Humerus	31	11	8	0
Soft Tissue				
Brain	7	13	5	0
Lung *	97	13	86	33
Mediastinum	10	21	6	33
Liver	31	14	24	14
Abdomen	15	9	7	8
Skin	162	22	268	53
Opposite breast	25	18	30	30
Lymph nodes	206	22	251	48

* Does not include pleural lesions, whereas in other tables pleural lesions are included under "lung" classification.

Estrogens: It is more difficult to determine the minimal duration of treatment for maximum response to the estrogens. Regression occurred only occasionally in bone and lung lesions of patients treated for less than six months. Soft tissue lesions in the majority of patients showed regressions after three months of therapy. The difference in time required for response of osseous and soft tissue lesions may be due to the necessity of depending on roentgen ray evidence of alterations in osseous and lung lesions, while visual and palpatory evidence is used in external lesions. This suggests that in patients with bone

and lung metastases, therapy should be given for a prolonged period before it is considered ineffective.

Methyltestosterone: In the few cases studied bone lesions responded earlier than soft tissue or lung lesions: Of those patients with bone lesions who responded, over half have shown

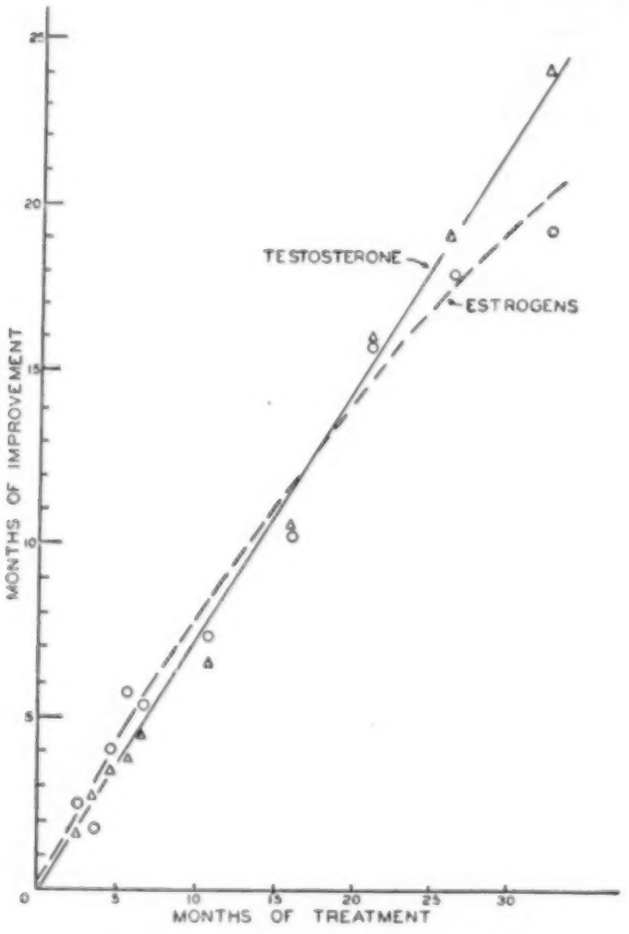

Chart 4.—Duration of subjective improvement.

such response at the end of three months of therapy. However, no patient with soft tissue or lung lesions responded until five months of treatment had elapsed.

DURATION OF IMPROVEMENT

Subjective Response: Although it is obvious that the duration of improvement should be related to the length of treatment, it is noteworthy that in the majority of cases the duration of improvement did not outlast the period of treatment. In many cases the disease became reactivated during treatment, necessitating cessation of therapy or change to another hormone. The duration of subjective improvement was similar in patients treated with testosterone propionate and those treated with estrogens except that a greater number of patients given testosterone experienced prolonged relief (18 months or more) (Chart 4).

Soft Tissue Regression: The duration of soft tissue regression was similar in patients treated with testosterone propionate and those treated with estrogens. There was an indication, however, (Chart 5) that the improvement lasted longer in patients treated with estrogens for five to 15 months than in those treated for similar periods with testosterone propionate.

Lung Lesion Regression: The duration of lung lesion regression with both testosterone propionate and estrogens was almost identical with that of soft tissue regression. Improvement continued slightly longer with estrogens than with testosterone propionate.

Bone Lesion Regression: In patients treated for 2 to 12 months, bone lesion regression is significantly longer with the use of testosterone propionate than with estrogens. In patients treated for more than 15 months, however, the duration of improvement is much greater with estrogens.

SURVIVAL

Garland et al.[4] have reported that palliative irradiation of patients with breast cancer metastatic to bone produced a mean survival time of 12 months. Most of the cases in the present series were even farther advanced than those reported by Garland: Approximately 85 per cent of the patients in this series had lesions too widespread to be amenable to irradiation or had previously received large doses of palliative roentgen irradiation. Nevertheless, the mean survival figures shown in table 4 closely approximate those reported by Garland for his series of patients treated with irradiation. These figures represent minimal survival times since they include only patients who have died at the time this report was prepared. Many patients still under treatment have survived for longer periods.

TABLE 4.—*Relation of Improvement to Survival of Patients with Advanced Mammary Cancer*

	Mean Time: Admission to Death			
	Testosterone		Estrogens	
Location of Lesions	Not Improved, Months	Improved, Months	Not Improved, Months	Improved, Months
Soft tissue.....	7.4	11.0	7.4	13.7
Bone lesions.....	8.9	13.6	8.9	14.4
Lung lesions.....	7.6	8.7	8.4	16.5
Mean	8.5		9.8	

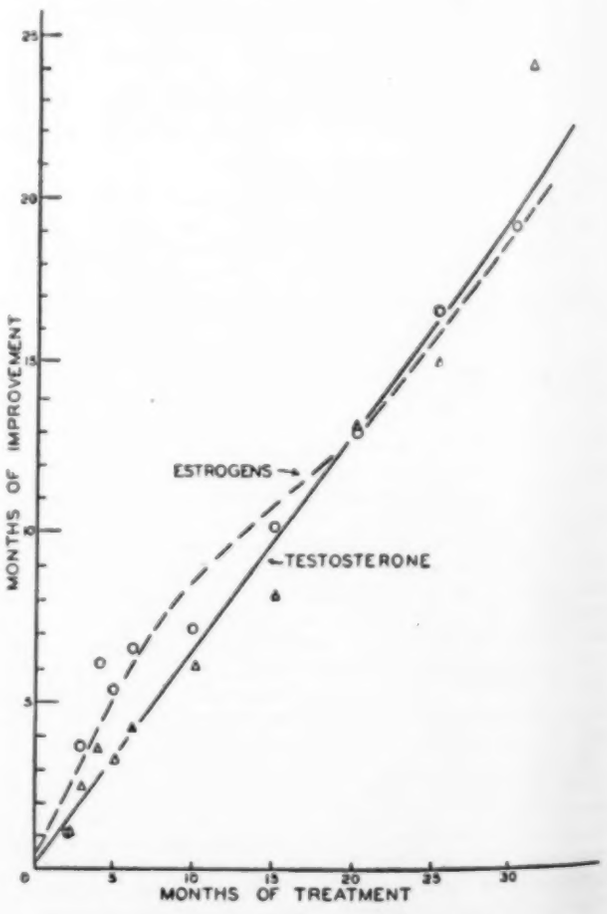

Chart 5.—Duration of soft tissue regression.

Patients aged 40 to 49 years who were treated with estrogens had a mean survival time of 7.6 months; patients aged 60 to 69 years, 9.1 months; those of 70 to 79 years, 10.6 months; and those of 80 to 89 years, 12.3 months (equal to the figure reported by Garland for patients with bone metastases). With

testosterone propionate the mean survival times for patients aged 40 to 49 and aged 70 to 79 were 7.5 and 7.4 months, respectively. Thus, the older patients treated with estrogens lived longer than the younger ones, a paradox not seen in patients treated with testosterone propionate.

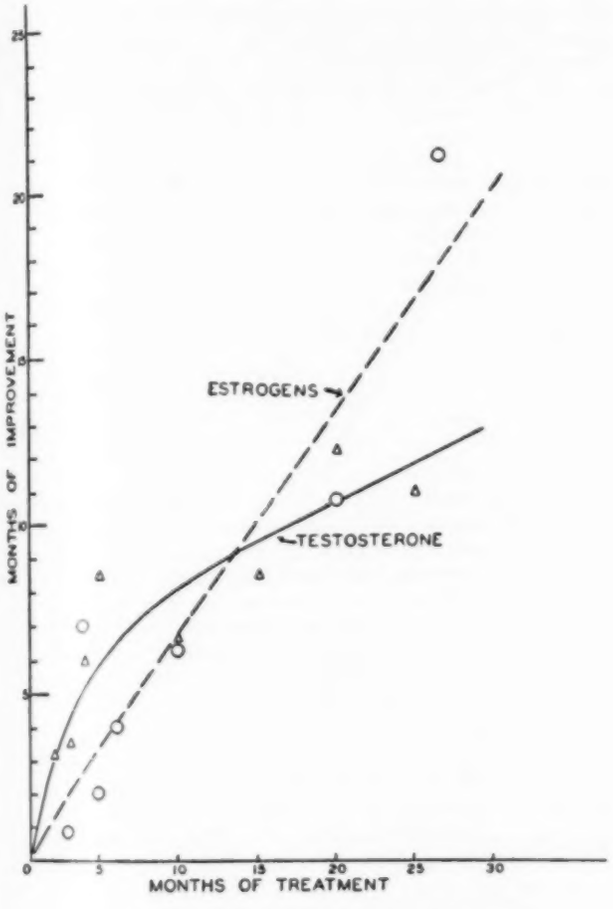

Chart 6.—Duration of bone regression.

Although it is possible that the nature and course of the disease in elderly people is different than that in younger ones, the disease being more lethal in the young, the difference in survival between the estrogen-treated and testosterone-treated patients in the older age group is significant.

That steroid therapy may prolong life is demonstrated by the comparison of survival times for improved and unimproved patients (Table 4). Patients whose condition was improved by treatment with estrogens lived nearly twice as long as those showing no improvement. Some of the differences shown in this table may be due to an automatic selection of cases. Patients showing no improvement may have been in poorer condition, had more advanced disease or may have been otherwise less satisfactory candidates for steroid therapy than those who showed improvement. This point will be subject to further study by the Committee. The fact that the survival times are measured from the admission to this study, and, further, that this point is somewhat variable with relation to the stage of the disease, introduces an uncontrolled variable into the estimate of survival times. Probably this is not too important a factor in a series as large as that under discussion.

SIDE EFFECTS

Testosterone Propionate: The large doses of testosterone employed frequently provoked unpleasant side effects, the commonest being those related to the masculinizing action of this hormone: hirsutism and deepening of the voice. An excellent discussion of these side effects has been given by Kennedy.[6] Table 5 lists the principal side effects noted and indicates that the incidence with which these effects are observed is approximately the same at all dosage levels. Not indicated in this chart is the observation that at the higher dosage levels these effects tend to be more pronounced. Furthermore, the longer the patient is treated, the more likely are these side effects to be observed.

Two side effects, edema and hypercalcemia, are potentially dangerous when present to a marked degree. Edema, observed in about one-fourth of the patients, results from salt retention. In elderly patients with lowered cardiac reserve or with preexisting cardiac impairment, this condition may precipitate cardiac failure. Such a complication has been observed in several patients in this series. At the earliest signs of edema, usually weight gain without concomitant increase in appetite or food intake, the patient should be placed on a salt-restricted diet and ammonium chloride administered. In the presence of frank edema, mercurial diuretics should be administered and the testosterone propionate should be discontinued, at least temporarily.

Spontaneous hypercalcemia is not uncommon in patients with osseous metastases, particularly if they are confined to bed. This will occur in about 10 per cent of patients.[7] However, testosterone propionate administration may also produce hypercalcemia in patients with osseous metastases. A high level of circulating ionized calcium can lead to kidney damage, central nervous system depression and may be fatal. The patient should be watched carefully during therapy and the blood calcium level determined at frequent intervals. Early signs indicating possible hypercalcemia are drowsiness, anorexia and nausea. Later signs are stupor and atonicity. Treatment by cessation of hormone therapy is usually sufficient to combat mild degrees of hypercalcemia; in the presence of severe degrees of this complication, Shorr has suggested intravenous infusion of 2.5 per cent sodium citrate in amounts sufficient to produce early, mild signs of tetany.[8] This therapy has been administered successfully to several patients in this series.

Methyltestosterone: The side effects of methyltestosterone are similar qualitatively and quantitatively to those of testosterone propionate. Liver damage has been reported in males receiving methyltestosterone.[9] One of the 17 patients administered methyltestosterone developed jaundice but no other evidence of impaired liver function after receiving 66 Gm. of the drug.

Estrogens: Table 6 lists the side effects observed with the various estrogens. Edema was fairly common during estrogen therapy. The mechanism is the same as for testosterone propionate and the same preventive measures should be employed.

Hypercalcemia, while less common than with testosterone, does occur and patients with osseous metastases should be observed carefully for this complication.

TABLE 5.—*Side Effects of Testosterone*

	75 Mg./Wk., %	150 Mg./Wk., %	300 Mg./Wk., %	600 Mg./Wk., %
Hirsutism	61	65	62	74
Incr. libido	36	27	24	19
Edema	25	29	28	23
Voice change	72	69	69	61
Bleeding	3	6	4	6
Acne	39	29	27	23
Flushing	33	22	17	16
Nausea	8	12	18	22
Vomiting	6	6	14	16
Loss of hair	6	10	4	3
Hypercalcemia	8	8	9	13

Nausea and vomiting were observed during therapy with every estrogen. This side effect frequently disappeared after two or three weeks of therapy, but occasionally was severe

6. Kennedy, B. J., in Proceedings First Conference on Steroid Hormones and Mammary Cancer, American Medical Association, Chicago, April 4-7, 1949.

7. Nathanson, I. T.: Personal communication to the Committee on Research. Adair, F. E.: Personal communication to the Committee on Research.

8. Shorr, E.: Personal communication to the Committee on Research.

9. Werner, S. C.; Hanger, S. M., and Kritzler, R. A.: Jaundice During Methyltestosterone Therapy, Am. J. Med. 8: 325, 1950.

enough to require discontinuance of treatment. Frequently, another estrogen will be found not to give these side effects and may be substituted.

Acceleration of tumor growth has been observed following hormone therapy most frequently in women treated with estrogens in the premenopausal or menopausal years. A few instances of acceleration have been observed following testosterone and progesterone therapy. This development calls for immediate cessation of hormone therapy.

HISTOPATHOLOGY OF TREATED TUMORS

Serial biopsies of accessible lesions obtained in this study have been investigated by a group of consultants in Pathology, Dr. Lauren V. Ackerman, Dr. Fred Stewart and Dr. Arthur Purdy Stout. The Armed Forces Institute of Pathology made facilities available in the American Registry of Pathology for collection and study of pathologic material submitted by the collaborating investigators. Dr. Hugh Grady, Scientific Director of the American Registry of Pathology, and his associates screened all material submitted and selected material for review.

The objective was to determine, if possible, whether the clinical effects observed were brought about by an action on the tumor cell or the stroma, or by some other mechanism which could be identified morphologically. Many of the cases were incomplete and there were very few lung and bone specimens. In no instance did the pathologist have adequate material of lesions of the lung or bone which showed prominent regression; study of such specimens might be of value.

TABLE 6.—*Side Effects of Estrogens*

	Diethylstilb., %	Ethinyl Estradiol, %	Premarin, %	Estrad. Dipropr., %	Dienestrol, %	Dimethyl Ether DES, %	Progesterone, %
Edema	33	32	35	50	21	17	18
Bleeding	26	15	27	50	38	31	0
Nausea	33	36	27	18	21	20	9
Vomiting	19	23	22	18	21	14	0
Pigmentation areola	46	57	40	41	37	60	9
Pigmentation axilla	21	36	5	23	13	34	0
Hypercalcemia	3	2	5	0	0	3	0
Incontinence	10	15	11	5	4	6	0

Many of the tumors obtained from cases showing clinical improvement showed no detectable histological changes. When affected by the hormones, the gamut of degenerative and necrotic changes and the resulting fibrosis are indistingishable from comparable changes induced by irradiation. Fibrosis and production of elastic tissue which sometimes follows treatment are also comparable to similar senile changes in the skin. In some instances following steroid therapy, skin nodules were completely free of tumor and there were focal areas of absence of tumor within the breast itself. In a few instances, metastatic carcinoma within the regional axillary nodes showed complete disappearance. When the treatment produces a destructive effect on tumor tissue it does not act equally on all of the tumor but to varying degrees so that some of the tumor may be completely destroyed, some is damaged but may recover and some seems unaffected. This is best seen in mastectomies after treatment.[10] It is possible that further information concerning sequential changes in tumor prominently affected by steroids could be obtained by better timing of the biopsies of regressing cases of carcinoma of the breast in which there are numerous satellite skin nodules.

In the mastectomy specimens the mammary gland tissue seldom showed changes which could be ascribed to treatment; even with extensive degeneration necrosis and scarring of the tumor, mammary gland tissue is usually but not always unaffected. The effect on the cells might be due to vascular damage or to a direct action on the cells. Unfortunately, the limited number of cases reviewed precluded intensive study. The vascular effect does not seem to be a true infarction, since this should result in death of all tissues in a given area, which very rarely happens. A reduction in nutrition might result in the effects noted, but there is no positive evidence of this.

In almost all of the autopsy specimens the hormonal effect upon the carcinoma had ceased and the lesions were growing vigorously. Only one lung metastasis was seen which seemed to show some cell swelling and nuclear pyknosis suggesting a continued hormonal effect. None of the bone sections with tumor showed any recognizable effect on the tumor cells including a case in which the frontal bone was biopsied after very marked roentgen evidences of reossification. In this biopsy there was no histological evidence of new bone formation. If the endocrine organs in a group of autopsies were studied, further information of value might be obtained.

No definite opinion could be formed concerning the relationship of breast tumor types to hormone sensitivity nor the influence of the amount of fibrous stroma or its vascularity on the effect. There were too few cases showing any effect to make this possible. The impression was gained that neither histological type nor amount and nature of the stroma are guides to hormone sensitivity any more than they are guides to radiosensitivity.

The consultants in pathology concluded that ordinary histological techniques can throw no light on the mechanism by which the clinical effects are brought about. The development of new cytochemical techniques may open another approach to this problem.

CONCLUSIONS

1. The best curative measure for mammary carcinoma available at present is early diagnosis and radical surgical removal of the tumor and surrounding tissue.

2. Three palliative measures are available to deal with metastatic mammary cancer: surgery for localized lesions, irradiation and hormone therapy. For most osseous or soft tissue lesions, irradiation is the treatment of choice; lung lesions, and very widespread osseous or soft tissue metastases may best be treated with hormone therapy.

3. The response of lesions to testosterone propionate does not appear to depend particularly on the physiologic age of the patient, whereas, estrogen therapy is ineffective and dangerous in premenopausal patients or patients at the menopause. The effectiveness of estrogen therapy of soft tissue and lung metastases appears to increase with the age of the patient.

4. Testosterone propionate is the hormone of choice for treatment of premenopausal women regardless of site of lesions. However, it should be remembered that castration is usually more effective in the premenopausal woman, and this should be the treatment of choice if there are no contraindications. In women five years or more postmenopausal, estrogens are the hormones of choice for treatment of soft tissue and lung metastases. Although osseous lesions of postmenopausal women respond equally to testosterone propionate or to estrogens, the superiority of testosterone in controlling subjective symptoms, particularly pain, makes it appear to be the drug of choice for these metastases.

5. The location of bone metastases does not influence the response. Skin and lymph node lesions respond more frequently than do other soft tissue lesions. Abdominal metastases are reported to respond least often.

6. An effective dosage schedule of testosterone propionate appears to be 50 mg. given three times weekly. The minimum total dose is about 3 Gm. and the minimum length of therapy should be three months before concluding that a patient will not respond.

7. The minimum total dose of diethylstilbestrol, dienestrol, Premarin and the dimethyl ether of diethylstilbestrol appears to be about 4 Gm. and the minimum duration of therapy about three to six months. For ethinyl estradiol and estradiol dipropionate, the minimum total dose appears to be 200 mg. and the minimum duration of therapy from 3 to 6 months.

10. These mastectomy specimens were generously furnished by Dr. I. T. Nathanson of Massachusetts General Hospital.

8. For the present, it is suggested that treatment with hormones should be continued until reactivation or steady progression of the disease occurs. Cessation of therapy after reactivation may result in another regression. Change of therapy to another hormone may also bring about a second favorable response.

9. The mean duration of improvement of soft tissue lesions, treated either with testosterone or estrogen is about 10 to 12 months; for bony lesions testosterone will produce a mean duration of improvement of about 11 to 12 months whereas the mean duration of improvement with estrogen is 16 to 18 months.

10. The mean survival time after admission to this study of all patients who have died is 8.5 months for testosterone-treated patients and 9.8 months for estrogen-treated patients. Patients who showed improvement survived about twice as long as those who did not show improvement.

11. Both testosterone propionate and the estrogens, in these doses, produce unpleasant side effects in a high proportion of patients. Two side effects, edema and hypercalcemia, are dangerous and require constant observation of the patient and early corrective measures. Estrogen therapy may cause severe uterine bleeding requiring curettage. With prolonged bleeding, the possibility of endometrial carcinoma or activation of fibroids must be considered.

12. Histologic examination of biopsy and autopsy material collected in this study has not revealed any changes in tumor cells or stroma which would suggest an explanation of the mechanism of hormonal action in metastatic breast cancer. At times, however, there was complete disappearance of tumor in satellite skin nodules, in focal areas within the breast carcinoma and in occasional lymph nodes previously replaced by tumor. The changes seen both in the tumor and stromal background in the cases responding to steroid therapy are comparable to the effects of irradiation.

COUNCIL ON FOODS AND NUTRITION

The following statements have been adopted by the Council on Foods and Nutrition for publication.

JAMES R. WILSON, M.D., *Secretary.*

WHOLESOME FOOD

The purpose of examining the concept of a wholesome food is to reemphasize the necessity for appraising all chemical technologic aids before they are used in connection with the growth, storage, preparation, or final processing of foods.

It long has been recognized that nutritional status is closely related to the quality of food eaten. It also has been recognized that wholesome foods must be clean and free from extraneous matter that may be incorporated as the result of careless or uncleanly methods of growth, storage or processing. Although micro-organisms which contribute to the value of a food may be incorporated intentionally or accidentally, disease-producing organisms have no place in foods intended for human consumption.

Although these basic concepts have acquired general recognition, the development recently of a large number of chemical technologic aids has emphasized the necessity for reexamining our idea of a wholesome food, particularly from the point of view of its freedom from chemical additives which may be harmful to the consumer because of toxicologic effects or because their incorporation in food causes or makes possible the reduction of nutritive value. For this reason the following short definition is offered:

A wholesome food is a product which makes a significant contribution to human dietary requirements and which is clean and free from micro-organisms and chemical additives of such quality or in such quantities that they may be directly injurious or result in reduced nutritional quality.

THE USE OF ALUMINUM COOKING UTENSILS IN THE PREPARATION OF FOODS

Periodically rumors are circulated to the effect that foods cooked in aluminum cooking utensils are deleterious to health because of injurious substances imparted by the vessel. Thus it becomes necessary to again call attention to pertinent facts about aluminum.

Aluminum abounds in the earth's crust and is widely distributed in nature being present in a wide range of edible plants. Undoubtedly man has ingested small quantities of aluminum daily since he came upon the earth. Aluminum compounds are also important and useful therapeutic agents.

The possibility that aluminum utensils can impart injurious agents to the foods cooked in them has been extensively investigated. Up to the present time there has been no cogent scientific evidence indicating that the minute traces of aluminum that may be imparted to food in the process of cooking are in any way injurious to the consumer. As for the rumor that the use of food prepared in aluminum cooking utensils is a factor in the causation of cancer, it may be added also that there is absolutely no scientific basis in support of this view.

In view of these facts it is the opinion of the Council that the use of aluminum cooking utensils is in no way injurious to health.

ACCEPTED FOODS

The following products have been accepted as conforming to the rules of the Council. JAMES R. WILSON, M.D., *Secretary.*

H. J. Heinz Company, Pittsburgh

HEINZ STRAINED SWEET POTATOES. Ingredients: Sweet potatoes, salt and water to prepare.

Analysis (submitted by manufacturer).—Total solids 14.56%, moisture 85.44%, ash 0.78%, fat (acid hydrolysis) 0.20%, protein (N × 6.25) 0.81%, crude fiber 0.61%, carbohydrates other than crude fiber (by difference) 12.16%, total sugar (as sucrose) 5.77%.

Vitamins and Minerals	Per 100 Gm.
Vitamin A activity	4360 I.U.
Thiamine	0.026 mg.
Riboflavin	0.024 mg.
Ascorbic acid	4.8 mg.
Nicotinic acid	0.230 mg.
Calcium	21.0 mg.
Phosphorus	30.0 mg.
Iron	0.25 mg.
Copper	0.12 mg.
Salt	400 mg.

Calories.—0.54 per gram; 15 per ounce.

Use.—For use in the feeding of infants, convalescents and others requiring a soft diet.

Reid Murdoch & Company, Division of Consolidated Grocers Corporation, Chicago.

MONARCH BRAND DIETETIC PACK GRAPEFRUIT SECTIONS consists of the fruit itself, packed in water without any added sugar or salt.

Analysis (submitted by manufacturer).—Available carbohydrates (total carbohydrate minus crude fiber) 7.0%, fat (ether extract) 0.7%, protein (N × 6.25) 0.6%, ash (minerals) 0.4%, sodium 8.6 mg./100 Gm., potassium 151 mg./100 Gm.

Calories.—0.35 per gram; 9.9 per ounce.

Use.—For use in calory-restricted, low sodium and other therapeutic diets.

MONARCH BRAND DIETETIC PACK BLACK RASPBERRIES consists of the fruit itself, packed in water without any added sugar or salt.

Analysis (submitted by manufacturer).—Available carbohydrates (total carbohydrate minus crude fiber) 9.0%, fat (ether extract) 1.0%, protein (N × 6.25) 1.1%, ash (minerals) 0.4%, sodium 0.44 mg./100 Gm., potassium 111 mg./100 Gm.

Calories.—0.50 per gram; 14.2 per ounce.

Use.—For use in calory-restricted, low sodium and other therapeutic diets.

MONARCH BRAND DIETETIC PACK SWEET GREEN PEAS consists of the vegetable itself, packed in water without any added salt.

Analysis (submitted by manufacturer).—Available carbohydrates (total carbohydrate minus crude fiber) 9.0%, fat (ether extract) 0.4%, protein (N × 6.25) 4.0%, ash (minerals) 0.3%, sodium 3.0 mg./100 Gm., potassium 78 mg./100 Gm.

Calories.—0.57 per gram; 16.2 per ounce.

Use.—For use in low sodium and other therapeutic diets.

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1951 CLINICAL SESSION TO BE HELD IN LOS ANGELES

Because of conflicting meetings, the unavailability of the Coliseum, and other considerations, the 1951 Clinical Session will be held in Los Angeles instead of in Houston, as originally planned. The action was taken on the recommendation of the Local Medical Committee on Arrangements and the Texas State Medical Association. Los Angeles was selected by unanimous vote of the Board of Trustees. The dates will remain unchanged—December 4-7, inclusive. The scientific exhibits will be in the Shrine Convention Hall.

ACUTE PHOSPHORUS POISONING

The diagnosis, symptoms and treatment of acute yellow phosphorus poisoning are discussed in a recent article by Diaz-Rivera and co-workers.[1] The presentation is based on data gathered from 56 cases of poisoning. Opportunity for studying such a large series of cases was attributed by the authors to the frequent attempts at suicide with phosphorus-containing rodenticidal pastes among Puerto Ricans. It is known that as little as 15 mg. of yellow phosphorus may produce severe toxic effects, while the fatal dose is generally considered to be about 100 mg. In a series studied by Diaz-Rivera and his colleagues, the estimated amount of phosphorus ingested ranged from 0.19 to 6.30 Gm., the average being 1.13 Gm. In five patients who ingested an average of 2.5 Gm. the course of action of the poison was fulminating, the patients dying within 12 hours from peripheral vascular collapse. Nine patients who ingested an average of 1.28 Gm. survived 13 to 24 hours. In the majority of these patients, restlessness, delirium and periods of toxic psychosis were manifest before death. All were intensely thirsty and suffered from severe nausea and vomiting, the vomitus frequently being bloody. Hepatomegaly developed in a few, but none were jaundiced. Five patients who had ingested approximately 1.5 Gm. did not die until the second day of illness. In addition to restlessness, emesis and delirium, hepatomegaly developed in all these patients and some became jaundiced. In many there was azotemia and oliguria. Terminally, the blood pressure reached shock levels. Two patients who had ingested 1.57 Gm. survived two to three days. Jaundice and oliguria developed in both, and their urine contained albumin and hyaline casts. Myocardial damage, thought to be the cause of death, was demonstrated by electrocardiographic studies. Of the remaining 35 patients who had ingested comparatively moderate amounts, 29 recovered, the others surviving at least five days. In the milder cases, symptoms appeared within 48 hours and included nausea, anorexia, epigastric pains and disagreeable taste in the mouth. Vomiting and constipation were not unusual. In others, severer manifestations developed within four to five days and consisted of severe vomiting, jaundice, hemorrhagic tendencies due to hypoprothrombinemia, oliguria and azotemia. Terminal manifestations included restlessness and toxic psychosis. It was noted that in some cases hyperphosphatemia developed after the fourth day. It was suggested that the phosphorus was initially promptly fixed by the body tissues, especially bone, and that with changes in acid-balance it was discharged into the circulation. This might explain the late manifestations of severe toxicity observed in some of the patients. The authors feel that, in acute phosphorus poisoning, immediate deaths are caused by peripheral vascular collapse, due either to a direct or an indirect effect on the cardiovascular system. With longer periods of survival, renal damage becomes manifest, while late deaths may be due to the combination of hepatic, renal and cardiac failure.

Treatment was directed at removal of the poison from the stomach by gastric lavage with potassium permanganate, prevention of further absorption by purgation with castor oil and general supportive measures designed to protect the organs most severely affected when absorption has taken place. Such measures included intravenous dextrose; high protein, high carbohydrate, and low fat diet; vitamin B complex, and crude liver extract. Five patients were given methionine, most of which, however, was lost through vomiting. Twenty-four patients received dimercaprol with poor results. Blood transfusions were considered contraindicated because of the fear that they might overload an already deficient circulation. The authors conclude that the deaths due to peripheral vascular collapse or to acute heart failure were unavoidable. They feel, however, that renal changes are due to disturbances in renal blood flow caused by the low systemic blood pressure and are as a rule reversible. Hence treatment of acute yellow phosphorus poisoning should be directed toward restoring the systemic blood pressure among those suffering from shock and toward obtaining proper hydration.

1. Diaz-Rivera, R. S.; Collazo, Pedro J.; Pons, E. R., and Torregrosa, M. V.: Medicine **29**: 269 (Dec.) 1950.

ANTIBIOTICS AND GROWTH

One of the notable achievements of the past few years has been the development of a number of new antibiotics, which have considerably strengthened the physician's armamentarium for the control of various bacterial infections. It is interesting to learn, however, that the value of antibiotics may extend beyond their original significance as bacteriostatic agents. The newly discovered property of growth promotion in experimental animals may become as important to man as the antibiotic property for which these substances were originally developed.

The discovery that certain antibiotics act as growth stimulants in animals dates back several years, particularly to the incidental observation in 1946 [1] that chicks given streptomycin grew at a somewhat faster rate than untreated controls. This unexpected result received little attention until, in 1949, another group of investigators,[2] studying the effects of the then recently isolated vitamin B_{12} on the growth of chicks, found that chicks given a crude concentrate of vitamin B_{12} grew at a more rapid rate than chicks given the pure, crystalline vitamin. At the time, the results were interpreted as suggesting that vitamin B_{12}, or at least the "animal protein factor," was multiple in nature. The crude concentrate of vitamin B_{12} in question was prepared from cultures of Streptomyces aureofaciens; subsequent chemical fractionation of this material, however, finally yielded a yellow crystalline compound, totally different from vitamin B_{12} but extremely active in promoting growth. The crystalline material showed the physical and chemical properties of aureomycin, one of the newer antibiotics. Subsequent studies with known pure crystalline aureomycin demonstrated that this substance was responsible for the observed growth stimulation.[3] In rapid succession a number of other investigators confirmed the growth-promoting effect of crystalline aureomycin in chicks and also in a number of other species, including pigs, rats, turkeys and cattle. Also, it was soon shown that several other antibiotics, including penicillin, streptomycin, chloramphenicol and terramycin, exert similar favorable effects on growth.

The mode of action of the various antibiotics in accelerating growth has not yet been established. One explanation would appear to be that they alter the intestinal flora, perhaps decreasing the number of bacteria having some possible deleterious effect on the growth of the host organism and increasing the micro-organisms that are favorable to the growth of the host. The latter micro-organisms are believed to function by way of the synthesis of certain vitamins or perhaps other substances beneficial in supplementary amounts to the growth of the host organism. However, investigations showing that parenterally administered or partially inactivated antibiotics still exhibit growth-promoting activity suggest that the antibiotics per se may be responsible for the observed acceleration of growth. This problem remains to be solved.

The widespread importance of the foregoing observations is at once apparent. Already commercial poultry and stock feeds enriched with various antibiotics or their concentrates are on the market. Poultry and stock growers are claiming a resulting average increase in growth of approximately 30 per cent over other animals fed the usual well balanced rations. The significance of this fact in terms of an increased supply of meat and poultry and, in turn, of probable lower prices and better protein nutrition for a larger portion of our population is obvious.

The implications of the foregoing work may extend even further than immediate practical applications. For example, a recent claim appeared in the literature [4] that aureomycin produced a definite hematologic response and improvement in five cases of Addisonian pernicious anemia. The beneficial effect of the antibiotic was attributed to its effect on the intestinal flora. While this study is obviously preliminary in nature and must be adequately confirmed before conclusions are warranted, it nevertheless points to another important potential usefulness of the antibiotic agents to man. Likewise, the observation again emphasizes the importance of normal gastrointestinal function to the health and well-being of the individual.

EXPERIMENTAL TELEVISION PRODUCTION PACKETS

The medical profession is examining the problem of educational employment of television, the latest medium for communicating with the public. The success of medical telecasts on closed circuits sponsored by commercial firms interested in medical progress has been well demonstrated. Telecasting of medical subjects to the public requires a considerably different approach.

Television is a costly medium because of expensive equipment, large personnel requirements and the need for a great deal of space, both for rehearsal and production. The number of available television channels is limited, and no channels have been assigned for educational broadcasting. Because of the high cost of the medium, stations are much more reluctant to offer free time for educational features than has been the case with radio, which is a much less costly medium.

In addition, the preparation of telecasts involves an appreciation of the fact that, while television has some of the aspects of the theater, some of the movies and some of radio, it is in fact not merely a combination of these but a new medium with new characteristics, new techniques and a new language. The Bureau of Health Education, under special authorization from the Board of Trustees, has prepared a television manual which is available without cost to county medical societies on request. This has been prepared by television experts under the supervision of the Bureau. In addition, the Bureau recently telecast a program, "Dr. Webb of Horseshoe Bend," which was kinescoped (a kinescope is a film reproduction of the original telecast with sound), and

1. Moore, P. R.; Evenson, A.; Luckey, T. D.; McCoy, E.; Elvehjem, C. A., and Hart, E. B.: J. Biol. Chem. **165**: 437, 1946.
2. Stokstad, E. L. R.; Jukes, T. H.; Pierce, J.; Page, A. C., and Franklin, A. L.: J. Biol. Chem. **180**: 647, 1949.
3. Stokstad, E. L. R., and Jukes, T. H.: Proc. Soc. Exper. Biol. & Med. **73**: 523, 1950.
4. Lichtman, H.; Ginsburg, V., and Watson, J.: Proc. Soc. Exper. Biol. & Med. **74**: 884, 1950.

the kinescopes have since been shown in 45 of a possible 65 television communities and have been well received. This telecast was costly.

Another approach to the television problem is to make available to local societies the materials for conducting a local telecast. This has been done by the Bureau in the form of television production packets. Each packet consists of an adequate supply of scripts plus lists of "properties" which must be assembled plus the necessary titles and explanatory material either on charts or film strip. These packets are available to local medical societies without cost. There are 12, each dealing with one of the following subjects:

1. School Health Examination
2. Home Care of the Sick
3. Cause of Backaches
4. First Aid
5. Snake Venoms and Antivenins
6. Safeguarding Children's Eyesight
7. Child Care
8. Preventive Medicine
9. Blood Pressure
10. The Human Heart
11. Slowing Down in Middle Life
12. Cancer

There are only three ways in which television can be made available to the medical profession as a tool for health education: (1) the kinescope, prepared and distributed by the American Medical Association and placed locally by county societies; (2) the telecast package, as above described, which will require more local preparation, and (3) sponsored broadcasting on the networks. All these possibilities are being explored.

The Bureau urgently requests all local medical societies to consider carefully the possibility of engaging in telecasting. The Bureau also solicits frank comments as to the local evaluation of materials made available. Television is in itself a new medium. Successful employment depends on free interchange of information and suggestions.

A NEW NITROGEN MUSTARD CONGENER IN CANCER CHEMOTHERAPY

During the past nine years the nitrogen mustard methyl-bis(beta-chloroethyl)amine (HN_2) has found a definite place in the treatment of malignant lymphomas, certain blood dyscrasias and inoperable bronchogenic carcinoma. Efforts have been made to discover a congener of nitrogen mustard that would be more effective against malignant cells and less toxic to normal cells. Recently, a new compound has been studied in the laboratory [1] and the clinic [2] which has certain advantages over nitrogen mustard HN_2 and which offers the possibility of extending the usefulness of this type of chemotherapy.

The new compound has already acquired several synonyms: triethylene melamine, TEM, and 2,4,6-triethyleneimino-*s*-triazine. It was first synthesized in Germany and used there in a commercial process for improving the finish of rayon fabrics. The chemical relationship of triethylene melamine to methyl-bis(beta-chlorethyl)amine led to the cancer chemotherapeutic investigations of the compound in England and America.

The experimental studies revealed that triethylene melamine had cytotoxic actions on normal and neoplastic cells that were qualitatively similar to the nitrogen mustards. It was further noted that the compound was active when given by mouth to experimental animals. This major advantage of triethylene melamine over the nitrogen mustard HN_2 has been demonstrated to apply to man also. The careful clinical evaluation of triethylene melamine by Karnofsky and his associates at the Memorial Center for Cancer and Allied Diseases and the report by Wright and co-workers at the Harlem Hospital have shown not only that the drug can be effectively administered by mouth but that the incidence and severity of nausea and vomiting produced is significantly less than occur with injection of nitrogen mustard. Triethylene melamine can also be given intravenously and may eventually replace methyl-bis(beta-chloroethyl)amine because of the less distressing gastrointestinal symptoms. The clinical studies indicate that triethylene melamine produces remissions in diseases that respond to nitrogen mustard and also causes leukopenia and thrombopenia completely analogous to the depressions observed after intravenously administered nitrogen mustard. The peculiar asset of the drug lies in its effectiveness after oral administration. This makes possible ambulatory management of patients and greatly facilitates the investigation of maintenance dose therapy to prolong remission intervals. Although it has not yet been conclusively demonstrated that long term treatment with small doses of triethylene melamine curtails the frequency of exacerbations in the malignant lymphomas, the evidence from Karnofsky's studies is encouraging.

Triethylene melamine will almost surely merit inclusion among the drugs available for the palliation of neoplastic diseases. The investigators who have studied this compound clearly point out, however, that the drug is effective against the same malignant diseases that respond to methyl-bis(beta-chloroethyl)amine and also that the depression of bone marrow function is similar after the administration of either agent. This emphasizes the specificity of cellular site and mechanism of action of the nitrogen mustards and triethylene melamine; these agents are related to each other, in that they both contain ethylenimino groups. On the basis of the experience with triethylene melamine and the many nitrogen mustards that have been studied in the laboratory, it may reasonably be concluded that the entire group is toxic to normal as well as to neoplastic cells.

1. Rose, F. L.; Hendry, J. A., and Walpole, A. L.: New Cytotoxic Agents with Tumor-Inhibitory Activity, Nature **165**: 993 (June 24) 1950. Lewis, M. R., and Crossley, M. L.: Retardation of Tumor Growth in Mice by Oral Administration of Ethylenimine Derivatives, Arch. Biochem. **26**: 319, 1950. Burchenal, J. H.; Johnston, S. F.; Cremer, M. A.; Webber, L. F., and Stock, C. C.: Chemotherapy of Leukemia: V. Effects of 2,4,6-Triethyleneimino-*s*-Triazine and Related Compounds on Transplanted Mouse Leukemia, Proc. Soc. Exper. Biol. & Med. **74**: 708 (Aug.) 1950.

2. Karnofsky, D. A.; Burchenal, J. H.; Armistead, G. C., Jr.; Southam, C. M.; Bernstein, J. L.; Craver, L. F., and Rhoads, C. P.: Triethylene Melamine in the Treatment of Neoplastic Disease: A Compound with Nitrogen-Mustard-like Activity, Suitable for Oral and Intravenous Use, Arch. Int. Med. **87**: 477 (April) 1951. Rhoads, C. P.; Karnofsky, D. A.; Burchenal, J. H., and Craver, L. F.: Triethylene Melamine in the Treatment of Hodgkin's Disease and Allied Neoplasms, Tr. Am. College Phys. **63**: 136, 1950. Wright, L. T.; Wright, J. C.; Prigot, A., and Weintraub, S.: Remissions Caused by Tri-Ethylene Melamine in Certain Neoplastic Diseases, J. Nat. M. A. **42**: 343, 1950.

ORGANIZATION SECTION

THE STATE JOURNAL ADVERTISING BUREAU

The State Journal Advertising Bureau, formerly the Cooperative Medical Advertising Bureau, serves 34 state medical journals, which are members of the bureau. These journals represent 42 state medical associations:

Alabama, Journal of Med. Assn. of
Arizona Medicine
Arkansas Med. Society, Journal of
Connecticut State Med. Journal
Delaware Med. Journal
District of Columbia Med., Annals of
Florida Med. Assn., Journal of
Georgia, Journal of Med. Assn. of
Hawaii Med. Journal
Indiana State Med. Assn., Journal of
Iowa State Med. Soc., Journal of
Kansas Med. Soc., Journal of
Kentucky Med. Journal
Maine Med. Assn., Journal of the
Michigan State Med. Soc., Journal of
Minnesota Medicine
Missouri State Med. Assn., Journal of
Nebraska State Med. Journal
New England Journal of Med. (Mass., New Hamp.)
New Jersey, Journal of Med. Soc. of
New Orleans Med. and Surgical Journal
North Carolina Med. Journal
Northwest Medicine (Oregon, Washington, Idaho & Alaska)
Ohio State Med. Journal
Oklahoma State Med. Assn., Journal of
Pennsylvania Med. Journal
Rocky Mountain Med. Journal (Colo., Mont., New Mex., Utah, Wyo.)
South Carolina Med. Assn., Journal of
South Dakota Journal of Med.
Tennessee State Med. Assn., Journal of
Texas State Journal of Med.
Virginia Med. Monthly
West Virginia Med. Journal
Wisconsin Med. Journal

Membership in the State Journal Advertising Bureau is limited to official publications of state medical societies which must adhere to the advertising standards adopted by the advisory committee for the bureau.

The bureau was established in 1913 by the Board of Trustees of the American Medical Association to assist state medical journals in securing revenue through the sale of advertising space in the journals. This assistance has provided substantial support for the state publications. For example, 1941 net sales were $151,823, while present indications for 1951 suggest a figure exceeding $641,000. On this basis, the gross sales will reach, or perhaps exceed, the $700,000 mark, a sum which should help much to defray the expenses of the member journals. The increase of the volume of business indicates clearly the value of the service provided by the bureau.

REGULATIONS FOR DIATHERMY EQUIPMENT

The office of the Council on Physical Medicine and Rehabilitation of the American Medical Association wishes to draw attention to certain regulations for medical diathermy equipment. There appeared in THE JOURNAL of Sept. 6, 1947, under the proceedings of the Council on Physical Medicine and Rehabilitation, Public Notice No. 7722, entitled "Order with Respect to Medical Diathermy and Industrial Heating Equipment and Notice of Proposed Rule Making with Respect to Miscellaneous Equipment" of the Federal Communications Commission. This document assigns three frequencies, in harmonic progression, for medical diathermy and industrial heating. The channels reserved are 13.66, 27.33 and 40.98 megacycles, corresponding to approximately 22, 11 and 7½ meters wavelength, respectively. The widths of the channels are approximately 15, 320 and 40 kilocycles, respectively. Another channel has been assigned, namely, 2,450 megacycles, corresponding roughly to 12.2 cm. wavelength. Frequencies of 915, 5,850, 10,600 and 18,000 megacycles have also been allocated for industrial, scientific and medical use.

Under these rules, apparatus either in use or manufactured prior to July 1, 1947, are exempt from the provisions of the rules for a period of five years. From July 1, 1947, provided no serious interference results from the operation of such equipment, it provides that the medical profession can continue to use uncontrolled short-wave diathermy until 1952, if the equipment does not cause serious interference. After that date the users of such equipment, old or new, must obtain approved apparatus according to the law.

The Council on Physical Medicine and Rehabilitation has on its accepted list diathermy equipment which not only meets the requirements of the Council but also carries the "type-approval" of the Federal Communications Commission. Although a year remains before the law goes into effect, the shortages of materials at the present time make it difficult for the manufacturers to provide diathermy equipment to meet the demand. The placing of orders immediately would seem advisable.

Uncontrolled short-wave diathermy apparatus cannot be changed economically to meet the rules and regulations of the Federal Communications Commission. It is possible for a qualified engineer to redesign the equipment, but the cost of labor and materials and the expense of having a representative of the Federal Trade Commission or an authorized engineer to examine it would be more than would be involved in the purchase of a new apparatus from a reliable manufacturer. A redesigned appliance must operate on one of the assigned frequencies, and the frequency must stay within the limits of tolerance under the influence of varying loads. Furthermore, the harmonic radiations should be suppressed to within the prescribed 25 microvolts per meter at a distance of a thousand feet. The radiation from an unaccepted powerful diathermy apparatus in the immediate vicinity will cause havoc in reception of television programs.

It is hoped that the critical shortage of materials will not be so great that the National Production Authority will be obliged to deprive the manufacturers of diathermy of the necessary supplies to meet the need.

MEDICAL LEGISLATION

FEDERAL

Physically Handicapped Children's Education

Senator Hill of Alabama introduced S. 1463, for himself and eight other senators. It would enable the states to make more adequate provision for special services required for the education of physically handicapped children of school age. The term "physically handicapped children" means children of school age who are crippled, blind, partially seeing, deaf, hard of hearing, defective in speech, tuberculous, epileptic, cardiopathic, or otherwise physically handicapped to such an extent that they require special services for their education. The services proposed would be designed to parallel the work being done now for crippled children under the Social Security Act.

The bill calls for an appropriation of 4 million dollars for the fiscal year ending June 30, 1952; 8 million for the fiscal year ending in 1953; 12 million for the fiscal year ending in 1954; 16 million for the fiscal year ending in 1955, and a like sum annually thereafter. These funds would be used to provide assistance to the several states to enable them to establish and develop special education services. The federal assistance would be allotted among the states on a formula in which per capita income and the number of school age children would be factors. For any state, the federal percentage could not exceed 75% nor be less than 33⅓%. States receiving federal assistance would be required to conform to minimum standards set forth in the bill. The sufficiency of state plans would be determined by the commissioner of education of the Federal Security Agency. A state would not be eligible for federal contribution for any year if the amount made available by the state and its subdivisions is less then their average expenditure for special services to the physi-

The summary of federal legislation was prepared by the Washington Office of the American Medical Association and the summary of state legislation by the Bureau of Legal Medicine and Legislation.

cally handicapped in the period 1947 to 1949. Expenditures of a state or its subdivisions for the purchase, maintenance, repair or rental of real estate could not be counted toward its share of the total expenditure for the program.

VA Benefits for Korea Veterans

Senate Joint Resolution 72 was introduced by Senator George of Georgia, for himself and four other senators. It provides that veterans serving on or after June 27, 1950, would be entitled to benefits of medical and hospital care, compensation, and pensions which were provided veterans of World War II. This resolution was introduced and passed by both Houses of Congress on May 10 and was signed by the President May 11, becoming Public Law No. 28. A dozen bills offering to provide similar benefits have been pending in Congress. The publication of the incident of a Korea veteran being denied hospital treatment brought this immediate action.

STATE

California

Bills Introduced.—A. 1504, to amend the Welfare and Institutions Code, proposes the addition of regulations relating to **epileptic persons** and would provide that such persons could be committed to state hospitals when they are in need of treatment or when they are suffering additionally from mental illness. A. 1579, to amend the Business and Professions Code, proposes that the regulations relating to the sale of drugs, chemicals, and medicines shall not apply to the sale of, among other things, sterilized sutures, **hypodermic needles and syringes,** medicinal gases, ether, chloroform, and ethyl chloride, injectable anesthetics of the procaine series, sulfa creams, ointments, and jellies used for introduction into the vaginal tract, where such sale is made to a physician, dentist, chiropodist, veterinarian, pharmacist, medical technician, or medical technologist, to a clinic, hospital, or other similar institution, or to an exporter.

Bills Enacted.—A. 71 has become Chapter 185 of the Laws of 1951. It amends the Business and Professions Code by establishing regulations relating to the **reinstatement of licenses** by persons serving in the armed forces. A. 1211 has become Chapter 143 of the Laws of 1951. It eliminates from the Business and Professions Code provisions relating to **midwives.** It also permits hospitals to appoint a graduate of an approved school as a resident or assistant resident for postgraduate training. A. 2674 has become Chapter 235 of the Laws of 1951. It amends the Business and Professions Code by making it a misdemeanor for an unlicensed person to **use the word "doctor,"** the letters or prefix "Dr.," the letters "M.D.," or any other term or letters indicating or implying that he is a physician, on any business card or letterhead. A. 2675 has become Chapter 318 of the Laws of 1951. It amends the Business and Professions Code by providing that applicants for the **physician's and surgeon's examination** graduating from school after Jan. 1, 1955, must present evidence of having completed a three year resident course of college grade, including the subjects of physics, chemistry, and biology, before commencing the study of medicine. A. 2676 has become Chapter 236 of the Laws of 1951. It amends the Business and Professions Code by providing that the adjudication of insanity or mental illness or the voluntary commitment or admission to a state hospital of any licentiate for a mental illness shall operate as a **suspension of the right to practice his profession** and such suspension shall continue until restoration to or declaration of sanity or mental competence. A. 2677 has become Chapter 237 of the Laws of 1951. It amends the Business and Professions Code relating to the subjects of examination for a physician's and surgeon's certificate by eliminating materia medica, pharmacology, and therapeutics and substituting therefore **pathology—gross and microscopic.** A. 2678 has become Chapter 238 of the Laws of 1951. It amends the Business and Professions Code by providing that every physician who, while in actual attendance on patients, is **intoxicated** to such an extent as to impair his ability to conduct the practice authorized by his certificate with safety to the public and his patients, shall be guilty of a misdemeanor. A. 2679 has become Chapter 239 of the Laws of 1951. It amends the Business and Professions Code relating to applicants for a physician's and surgeon's certificate whose application is based on a diploma from a **foreign medical school** by providing that in lieu of a one year internship in a hospital approved by the board, the applicant may have completed his final year of medical instruction in an approved medical school in the United States. S. 1602 has become Chapter 298 of the Laws of 1951. It authorizes the board of medical examiners to grant approval of the employment of **physicians and surgeons on a salary basis** by licensed charitable institutions, foundations, or clinics or by approved medical schools operating clinics therewith, if no charge for professional services rendered to patients is made by the institution.

Florida

Bills Introduced.—H. 520, proposes to authorize the Florida State Board of Health to make use of the **injunctive process** to restrain or prevent the violation of any statute of which the board is charged with the enforcement. H. 526, proposes that **expert witnesses** who have testified in court shall be allowed a witness fee in such reasonable amount as the trial judge may determine and that the amount of such fee shall be taxed as costs in the case. H. 579 proposes to require physicians to **register annually** with the State Board of Health. H. 635 and S. 543 propose to authorize the superintendent of any institution under the direction of the Board of Commissioners of State Institutions, when medical and dental personnel is needed but cannot be obtained in the state, to employ competent, **experienced, medical or dental personnel** from outside of the state. Such personnel would not be required to be examined and licensed to practice their profession, so long as they are engaged exclusively on the medical or dental staff of such institution and do not engage in private practice within the state. S. 492 and H. 605 propose that either the state attorney or the county solicitor may have **autopsies** performed on dead bodies found within the county, before internment, whenever in the opinion of such person such autopsies are necessary to ascertain whether death resulted from a criminal act or as the result of criminal negligence. The proposal would also provide that the reasonable charges of physicians performing such autopsies should be paid from the County General Fund.

Bills Enacted.—H. 90 became law without approval May 9, 1951. It amends the medical practice act by requiring applicants for a license to be **citizens of the United States.** (Previously it was permissable for them to show that they had filed a declaration of intention to become a citizen.) It also permits the board to accept evidence from the applicant that he has received training in hospitals sufficient to bring his medical education up to a standard equivalent to that of graduates of approved medical schools in the event that the applicant is not such a graduate. H. 91 became law without approval May 9, 1951. It amends the medical practice act by authorizing the board to pass on the **good standing and reputability of any hospital** and to determine those that maintain a standard of training sufficient to be recognized by the board when considering medical examinations given by the board. H. 93 became law without approval May 9, 1951. It amends the medical practice act by providing that when a person has been adjudicated insane he shall be deemed **disqualified to practice medicine** so long as such adjudication shall remain in full force and effect. H. 94 became law without approval May 9, 1951. It amends the **medical practice act** by exempting therefrom optometrists and pharmacists duly licensed by their respective state boards and also persons furnishing medical assistance in case of emergency. The law further sets forth regulations relating to the registration of every graduate of a medical school and every person practicing as a resident physician, assistant resident physician or intern in any hospital in the state. No person is permitted to be employed or act as a resident physician, assistant resident physician, or intern who has not so registered. H. 96 became law without approval May 9, 1951. It provides that a **certificate by the board of medical examiners,** board of osteopathic medical examiners, board of chiropractic examiners, board of naturopathic examiners, board of optometry, board of examiners for nurses, board of pharmacy, or board of dental examiners, certifying that the records of such board evidence, or fail to evidence, the issuance of any license to practice any of such professions shall be admissible in all courts and may be impeached only by positive documentary evidence or testimony of not less than two witnesses.

Illinois

Bills Introduced.—H. R. 65, proposes the creation of a committee to investigate the need for and the desirability of a state institution for **narcotic addicts.** H. 872, proposes to authorize the Department of Registration and Education to license persons desiring to practice **physiotherapy,** which is defined as the method, art, or science of treating the human body for hygienic or remedial purposes by the following methods: massage and manipulations with the hands or with any other physiotherapy modality, and the use of such adjuncts as light, heat, air, water, diet, gymnastics, and electricity. S. R. 53, proposes the creation of a committee to make an investigation relating to the establishment of a hospital in Chicago for the treatment of acute mental patients, especially those addicted to the habitual use of **narcotics and alcohol.**

Massachusetts

Bills Introduced.—H. 2455, proposes regulations for the licensing of persons desiring to conduct a **dispensary.** H. 2468, proposes to authorize the Board of Registration in Medicine to issue licenses and to regulate the practice of **physical therapy,** which is defined to mean the treatment of any bodily or mental condition of any person by the use of the physical, chemical, and other properties of heat, light, water, electricity, massage, and active and passive exercise. The use of roentgen rays and radium for diagnostic and therapeutic purposes and the use of electricity for surgical purposes, including cauterization, would not be permitted under the proposal.

Bill Enacted.—H. 2310 has become Resolution Chapter 11 of the Laws of 1951. It directs the Judicial council to investigate relative to the existing statutes relating to **alcoholism.**

Texas

Bill Enacted.—H. 47, was approved May 3, 1951. It provides for the creation of a **board of vocational nurse examiners** and defines a licensed vocational nurse as a person who directly attends or cares for the sick for compensation or hire, and whose personal qualifications, preliminary education, or nursing education in biological, physical, and social sciences will not qualify that person to become certified as a professional registered nurse.

Vermont

Bill Enacted.—S. 39, was approved April 27, 1951. It eliminates from membership on the **state board of medical registration** the two homeopathic physicians who were previously required to be members thereof.

Wisconsin

Bill Enacted.—S. 374 has become Chapter 120 of the Laws of 1951. It authorizes the board of medical examiners to issue licenses to practice medicine and surgery or osteopathy and surgery and to accept, in lieu of its own examination, the certificate of the **national board of medical examiners.**

MEDICAL NEWS

COLORADO

Annual Alumni Session.—The Medical Alumni Association of the University of Colorado School of Medicine, Denver, will hold its 26th annual session on June 1-2. The annual senior-alumni baseball game and annual banquet climax the two-day meeting. The second annual Colorado Intern-Resident Clinics on June 4-5 have been arranged by an intern-resident committee. Dr. Robert M. Zollinger, professor and chairman of the department of surgery at Ohio State University College of Medicine, Columbus, will be the guest surgeon and lecturer and will deliver the second annual intern-resident lecture on "Recent Advances in Burn Therapy." The afternoon sessions will consist of 18 papers by the resident staff.

CONNECTICUT

Summer School of Alcohol Studies.—The ninth annual session of the summer school of alcohol studies will be held at Yale University July 7-Aug. 3 under the direction of Selden D. Bacon, director of Yale's section on alcohol studies. Registration for this year's session will take place July 7-8 with the first lecture and a reception planned for the night of July 8. Dr. Howard W. Haggard, director, Yale Laboratory of Applied Physiology, will be the initial speaker. The curriculum is divided into four phases and consists of 62 lectures, 15 hours of seminars, informal group meetings, visits to the laboratory, clinic and other facilities, and individual consultations with staff members. The four major divisions of the curriculum are: (1) orientation, with emphasis on scientific methods as applied to problems of alcohol; (2) physiology, psychology and cultural sociology in relation to alcoholic beverages; (3) the major problem areas, and (4) description and analysis of responses to these problems. Since the school's inception in 1943 over 1,160 persons have completed the course. Students from every state in the United States, most of the Canadian provinces, and countries in Central and South America, Europe and the Orient are among the graduates. Academic credit for students can be obtained through arrangement with the degree-granting authority of the institution with which the student is registered. Correspondence should be addressed to: Summer School of Alcohol Studies, Laboratory of Applied Physiology, Yale University, 52 Hillhouse Ave., New Haven, Conn.

Dr. Braceland Joins Institute of Living.—Dr. Francis James Braceland, consultant in psychiatry at the Mayo Clinic, Rochester, Minn., has been named psychiatrist-in-chief of the Institute of Living. Dr. Braceland, at present secretary and treasurer of the American Board of Psychiatry, has been a fellow and clinical director of the Pennsylvania Hospital, Department for Mental and Nervous Diseases, Philadelphia. He has been successively associate professor of psychiatry, Women's Medical College, Philadelphia, assistant professor of psychiatry, graduate school, University of Pennsylvania, Philadelphia, and dean and professor of psychiatry at Loyola University School of Medicine, Chicago. During World War II he was a special assistant in psychiatry to the Surgeon General of the U. S. Navy and later chief of the division of neuropsychiatry, Bureau of Medicine and Surgery.

DISTRICT OF COLUMBIA

Course in Sight Saving and Braille.—A special summer course will be held at the Catholic University of America, Washington, D. C., July 2 through Aug. 11 to train teachers of sight saving classes and teachers of Braille classes. A clinic and lectures by outstanding ophthalmologists, observation, and Braille teaching classes make up the course. Address inquiries to Roy J. Deferrari, Office of the Secretary General, Catholic University of America, Washington 17, D. C.

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education and public health. Programs should be received at least three weeks before the date of meeting.

ILLINOIS

Rabies Quarantine.—The state department of agriculture imposed a rabies quarantine in Benton, Franklin County, after three children and four adults were given Pasteur treatments after being bitten or otherwise exposed to two rabid dogs. During April and early May, 53 persons in West Frankfort were compelled to take Pasteur anti-rabic treatments. At least 20 persons reportedly had been exposed to the disease in nearby Williamson County, which is also under quarantine.

Cancer Symposium.—A cancer symposium was held at the Herrin state diagnostic cancer clinic on May 17 for the physicians of the Ninth and Tenth districts of the Illinois State Medical Society. The program was arranged in cooperation with the American Cancer Society, the division of cancer control of the state department of public health, and the American Academy of General Practice. The program, beginning at 1:30 p. m., was as follows:

John B. Frerichs, St. Louis, Cytology of Cancer and the General Practitioner.
Chester C. Guy, Chicago, Tumors of the Biliary Tract.
Helmut P. Seckel, Chicago, Malignant Tumors in Children.
Leo J. Brown and Friedrich P. Bornstein, Herrin, Case Presentations from the Herrin Hospital Cancer Clinic.

Dr. Paul C. Bucy of the University of Illinois College of Medicine, Chicago, spoke at the dinner at the LyMar Hotel at 7:30 p. m. on "Early Diagnosis of Intracranial Lesions."

Chicago

New Head of Tumor Institute.—Dr. James T. Case, radiologist, has been named president of the Chicago Tumor Institute succeeding Dr. Ludvig Hektoen, who has been elected president emeritus.

Multiple Sclerosis Research.—On May 31 the Multiple Sclerosis Foundation presented the first installment of a five-year $125,000 grant for basic research to Northwestern University Medical School. The fund will establish the first research program in the Middle West for multiple sclerosis.

Course in Techniques in Virology.—An eight-week summer course for bacteriologists interested in gaining laboratory experience in basic techniques in virology will be offered by the University of Illinois, Chicago Professional Colleges, June 25-Aug. 18. It will be given under the direction of Dr. John E. Kempf, associate professor of bacteriology. Graduate credit will be awarded for satisfactory completion of the course. Requirements for admission are a bachelor's degree, basic course work in bacteriology, and qualifications for registration in the graduate college of the university. The tuition is $17.50 for residents of Illinois. Requests for information should be addressed to Dr. Milan V. Novak, Associate Dean of the Graduate College, Chicago Professional Colleges, University of Illinois, 808 S. Wood St., Chicago 12.

IOWA

Society News.—The Polk County Medical Society concluded its current program year April 18 with a Cancer Institute at the Hotel Savery in Des Moines. Visiting speakers included: Drs. Charles L. Eckert, Washington, D. C.; Joseph H. Burchenal, New York; Harold L. Stewart, Bethesda, Md., and Walter L. Palmer, Chicago.

Memorial Library for Doctor Wilkins.—Since the death of Dr. Donald Wilkins of Ames in Korea Oct. 5, 1950, a number of his colleagues and friends have planned to create a memorial to him in the form of a library fund to establish and build a collection of books, journals, and reprints on anesthesiology. The fund will be called the Wilkins Memorial Library Fund. Any of Dr. Wilkins' friends who desire further information with reference to this fund or to contribute to it should write Dr. Stuart C. Cullen, Chairman, Division of Anesthesiology, University Hospitals, Iowa City.

KENTUCKY

Mental Hygiene Committee.—An Advisory Committee on Mental Hygiene to assist in the improvement of the mental hospital treatment program has been appointed by Governor Wetherby. Members of the committee, of which Dr. S. Spaford Ackerly, Louisville, is chairman, are Drs. Bruce Underwood, Louisville; John H. Rompf, Lexington, and Robert Charles Smith, Newport.

Health Official Appointed.—Dr. Charles E. Reddick assumed his duties as deputy state health commissioner and director of local health services for the state department of health April 16. He is a former Paducah-McCracken county health officer and comes to his new position from the Arizona Department of Health, Phoenix, where he has served as director of local health administration for the past three years. Dr. Reddick succeeds Dr. Harold M. Kelso, who resigned January 1 to return to Knoxville, Tenn., as assistant city health officer.

MASSACHUSETTS

Personal.—Dr. Samuel A. Levine, clinical professor of medicine at Harvard Medical School, Boston, and member of the senior staff of the Peter Bent Brigham Hospital, Boston, served as professor of medicine "Pro Tem" at Georgetown University School of Medicine, Washington, D. C., April 1-7. The program was devoted to informal ward rounds and small group teaching for the senior medical students and the house staff.

State Institute of Laboratories.—Dr. Johannes Ipsen of the Harvard School of Public Health has been appointed superintendent of the newly-formed Massachusetts Institute of Laboratories, which will contain four state-operated laboratories under one administration. The state public health department has long provided free diagnostic and other direct services to physicians and local boards of health through its four laboratories. The four laboratories now combined into one institute are: (1) the diagnostic laboratory under Dr. Robert A. MacCready; (2) the biological laboratory, directed by James A. McComb; (3) the Wassermann Laboratory, directed by Dr. William A. Hinton, and (4) the blood laboratory. All four are located on South Street, Jamaica Plain. Dr. Ipsen in 1938 became director of the League of Nations' department of biological standards, where he was responsible for setting and maintaining standards of vaccines and serums all over the world for the League of Nations. He held this post until 1947, when the United Nations' World Health Organization took over this work.

MICHIGAN

Upper Peninsula Medical Society Meeting.—The Marquette-Alger County Medical Society will be host to the Upper Peninsula Medical Society, meeting in Marquette June 22-24. Guest speakers at the session will include:

M. Edward Davis, Chicago, Recent Advances in Diagnosis and Treatment of Carcinoma of the Uterus.
Frederick Schreiber, Detroit, Head Injuries.
George J. Curry, Flint, Recent Advances in Treatment of Ankle Injuries.
Harry R. Foerster, Milwaukee, Dermatology.
Robert L. Parker, Rochester, Minn., Cardiology.
Harry A. Towsley, Ann Arbor, Pediatrics.
Gordon B. Myers, Detroit, Disturbances of Blood Potassium.
Oliver H. Beahrs, Rochester, Minn., Carcinoma of the Thyroid.
Rudolf J. Noer, Detroit, Gastro-Intestinal Hemorrhage.
John M. Sheldon, Ann Arbor, Allergy in General Practice.
Samuel W. Hartwell, Lansing, Office Mental Hygiene.

The Woman's Auxiliary will meet in conjunction with the society. The annual banquet will be held Saturday at 7 p. m. Technical exhibits will be shown.

Annual Conference on Aging.—The University of Michigan announces its fourth annual Conference on Aging will be held in Ann Arbor July 11-13. Rehabilitation of the older handicapped person will be the topic of this year's conference. American and foreign authorities will discuss questions raised at the meetings. Attention will be directed to medical, psychosocial, economic, and vocational aspects of retaining the over-40 workers in the labor force and the role of these workers with reference to mobilization. The conference is under the co-sponsorship of the Institute for Human Adjustment, school of medicine, school of public health and extension service of the University of Michigan, the Office of Vocational Rehabilitation of the Federal Security Agency, and the Michigan Department of Vocational Rehabilitation. Room reservations should be made by writing to the Michigan Union, Ann Arbor. For further information write to Dr. Wilma Donahue, Institute for Human Adjustment, Room 1510, Rackham Building, Ann Arbor.

MISSOURI

Friends Honor 50-Year Practitioner.—More than 1,000 persons attended a reception in Kansas City in honor of Dr. Max Goldman, who has practiced medicine for 50 years. Earlier the staff of St. Mary's Hospital presented him a gold medal that bore an engraving of the hospital and an inscription of appreciation.

State Medical Election.—The Missouri State Medical Association at its meeting in Kansas City April 22-25 installed Dr. C. Edgar Virden, Kansas City, as president. Other officers for the coming year include: J. William Thompson, St. Louis, president-elect; H. E. Petersen, St. Joseph, secretary, and Charles E. Hyndman, St. Louis, treasurer. Delegates to the American Medical Association are Drs. Robert E. Schlueter, St. Louis, and James R. McVay, Kansas City. Their respective alternates are Drs. Flavius G. Pernoud, St. Louis, and Rolla B. Wray, Nevada.

NEW YORK

Cerebral Palsy Center.—The Nassau County Cerebral Association broke ground May 6 for its $225,000 cerebral palsy diagnostic and treatment center at Roosevelt, L. I. The association now operates a temporary palsy center in the Hempstead American Legion building.

Anesthetists Placement Committee.—The Placement Committee of the New York State Society of Anesthesiologists, under the chairmanship of Dr. Philip H. Sechzer, Laurelton, will function as a central clearing house and counseling service for physicians, groups and institutions. The society office is at 137 W. 11th St., New York 11, N. Y. The committee will determine vacancies in the state open to anesthesiologists. The state will be surveyed to discover localities where no professional service in anesthesia is available. The committee will be available for consultation with any physician who intends to practice anesthesiology within New York State.

Medical Jurisprudence Society.—The Society of Medical Jurisprudence held a meeting at 8:30 p. m. May 14 in room 440 of the New York Academy of Medicine building. Col. Howard J. Hutter, instructor in radiology, New York University-Bellevue Medical Center, New York, presented a paper on "How to 'Read' an X-Ray Film." This was followed by a discussion from the medical expert's standpoint by Dr. Solomon Fineman, assistant clinical professor of radiology at Columbia University, New York, who also spoke on pitfalls in x-ray diagnosis. Dr. Frank R. Ferlaino, assistant clinical professor of industrial medicine at New York Post-Graduate Hospital and Dispensary, discussed the paper from the industrial and liability examiner's standpoint. The meeting was open for members and their guests.

New York City

Research on Bacteriophage.—A grant of $50,000 has been received by the Roosevelt Hospital to support a five year research program in the field of bacteriophage. The money will be disbursed at the rate of $10,000 a year. The donor requested that the gift be anonymous. Dr. Simon A. Beisler, president of the hospital's medical board and head of the division of urology, will guide the project to develop a phage.

Infirmary Postgraduate Courses.—The complete reorganization of postgraduate courses at the New York Eye and Ear Infirmary has been accomplished, under the direction of Dr. Raymond E. Meek, chairman, and Dr. J. Gordon Cole, secretary-treasurer. Postgraduate courses for both eye and ear specialists are given throughout the year and are available for a limited number of students applying to the registrar at the infirmary.

Dr. Schaefer to Receive Remington Medal.—Hugo H. Schaefer, Ph.D., treasurer of the American Pharmaceutical Association and dean of the Brooklyn College of Pharmacy, will receive pharmacy's highest honor, the Remington Medal, at a dinner in New York in the fall. The past presidents of the American Pharmaceutical Association served as the jury of award. Dr. Schaefer was commended for his unselfish service to the profession over the past 30 years. He was cited for his leadership in the development of sound educational procedures in American pharmacy, his contributions to the work of the U. S. Pharmacopoeia and National Formulary revision, his contributions to the solution of problems involving food and drug legislation, and his public service as chemist to the New York Board of Pharmacy and adviser to the War Production Board in World War II.

Grant for City Day Camps.—The New York Fund for Children, Inc., has made a grant of $30,000 to the New York City Department of Health to finance department activities in relation to improving conditions for children in day camps. There were about 280 camps operating in and around the city last summer, and from 75,000 to 100,000 children attended. In city day camps children live at home and attend the camp, usually six or eight hours a day. The grant will be used toward: (1) Inspection of camps to eliminate unsanitary and other undesirable practices; (2) educational efforts with camp operators, directors, and other personnel aimed at developing and gaining acceptance of higher standards for camps; (3) educational efforts with parents (through publicity in newspapers, by radio, with pamphlets and so on) to help them select day camps for their children, and (4) stimulating an interest in local universities and colleges in health problems involving the operation of day camps.

NORTH CAROLINA

Postgraduate Course.—The Duke University School of Medicine's spring medical postgraduate course will be held in Durham June 18-21. Papers will be given during the morning sessions, ward rounds or visits to clinics will be held in the afternoons. Round table discussions on Monday and Tuesday evenings will be devoted to the use of drugs in cardiovascular diseases and pain.

OHIO

Society News.—The recently-organized Cleveland Society of Physical Medicine and Rehabilitation has elected the following officers: Dr. Shelby G. Gamble, Cleveland, president; Dr. Harry T. Zankel, Cleveland, vice president, and Dr. Bert A. Treister, University Heights, secretary-treasurer.

State Medical Election.—At the April meeting of the Ohio State Medical Association in Cincinnati Dr. Fred W. Dixon, Cleveland Heights, was installed as president, and Dr. Harve M. Clodfelter, Columbus, was chosen president-elect. Dr. Henry P. Worstell, Columbus, was elected treasurer in 1949 for a three-year term. The 1952 meeting will be held in Cleveland May 20-22.

Dr. Lotspeich to Head Department of Physiology.—A 1944 honor graduate of the University of Cincinnati College of Medicine, Dr. William D. Lotspeich, physiologist, finishing a fellowship at Oxford University, England, will return to his alma mater next September as head of the department of physiology. He will succeed Dr. Martin H. Fischer, now professor emeritus of physiology. Dr. Gustav Eckstein, associate professor of physiology, has been acting department head. Dr. Lotspeich was appointed instructor in physiology at Cornell University Medical School, New York, in 1945, then went to the University of Syracuse Medical School as an assistant professor of physiology. Since 1948 he has held a scholarship in medical sciences from the John and Mary R. Markle Foundation.

Dedicate Health Center at Columbus.—The new health center at the Ohio State University was dedicated at outdoor ceremonies May 15. Top officials of the university and state welfare and health departments participated in the ceremonies. Dr. Raymond B. Allen, president of the University of Washington at Seattle, delivered the dedication address. The four buildings in the 15½ million dollar center are the Dentistry Building, the Ohio Tuberculosis Hospital, under the state health department, the 600-bed University Hospital, and the Columbus Receiving Hospital, under the state welfare department. Outstanding alumni of the colleges of medicine and dentistry were presented with awards in recognition of contributions to their respective fields, the first such awards given by the two colleges. Those receiving medical alumni awards were: Drs. Jonathan Forman and Herbert M. Platter, both of Columbus; Dr. Joseph H. McNinch, Washington, D. C.; Dr. James C. Sargent, Milwaukee, and Dr. Alfred H. Whittaker, Detroit. Scientific sessions of physicians and dentists and conferences of nurses were scheduled for the week. The new University Hospital is a single-line building, 400 feet long and 50 feet wide consisting of 12 floors. Its length was determined by typical nursing floors consisting of three nursing units of approximately 30 beds each. The majority of the wards run continuously along the south side of the corridor. Beds are proportioned on the basis of approximately 11 per cent in single rooms, 50 per cent in double rooms, and 39 per cent in four-bed rooms. Floors six through eleven contain the patient rooms. The operating rooms and adjunct services and laboratories are located on the fourth floor. One operating room is equipped with louvers in the ceiling through which color movies may be taken. The room is also equipped with conduits for televising the operations. On the operating floor is a clinical observation and lecture room with a "one-way" observation panel into one of the 12 operating rooms. The third floor is devoted to diagnostic laboratories serving the needs of the entire center. The second floor contains the departments of radiology and physical therapy, which will give complete service to the general hospital patients. These lower floors are accessible to students and to patients from adjacent hospitals without passing through the hospital wards. Administrative offices are located on the first floor, while the emergency rooms, receiving, supplies, storage, and kitchen are on the ground floor. The administration of the various buildings in the program is under separate college or state departments, but all are a coordinated part of the health center. Space vacated in Hamilton Hall by the college of dentistry, which has moved to its new building in the health center, is being utilized and enlarged for the increased enrollment in the college of medicine.

The four new buildings of the 15½ million dollar health center at Ohio State University: (1) Ohio Tuberculosis Hospital; (2) Columbus Receiving Hospital; (3) University Hospital, and (4) Dentistry Building.

PENNSYLVANIA

Society News.—The George F. Geisinger Memorial Hospital and the Foss Clinic at Danville conducted a postgraduate seminar April 20. Among the speakers was Dr. Russell E. Teague, Philadelphia, secretary of health of Pennsylvania, who spoke on state public health problems.

Clean Streams Program.—Nine additional municipalities have received a total of over $96,770 from state funds as part payment of the cost of preparing plans for sewage treatment works under the state's clean streams program. The latest municipalities to receive checks are Scranton, North York, Christiana, Millerstown, Galeton, Clearfield, Nanticoke, Honesdale and

Coudersport. These payments bring the total paid to 189 municipalities to $1,035,148.87. Under the clean streams program payments of up to 50 per cent of the cost of plans for sewage treatment works are paid municipalities from state funds. Payments are figured on costs that prevailed in 1942, in accordance with the clean streams law.

Philadelphia

Chapin Medal Award.—Dr. Hobart A. Reimann, head, department of experimental medicine of Jefferson Medical College of Philadelphia, delivered the 10th Charles V. Chapin oration May 9 and received the Chapin Medal awarded by the City of Providence and the Rhode Island Medical Society in Providence. The medal is awarded annually to a physician who has made important contributions to medical knowledge. The present recipient was recognized for his pioneer work on the viral pneumonias, viral dysentery, and other diseases.

Pittsburgh

New Department of Biochemistry and Nutrition.—A department of biological chemistry and nutrition has been organized at the University of Pittsburgh Graduate School of Public Health, with Robert E. Olson, Ph.D., as professor and head and as lecturer in the department of medicine in the school of medicine. The department, in addition to its teaching responsibility, will have a program of basic research that will center initially around the study of cellular physiology, with particular attention to the study of tissue enzymes and of the vitamin-enzyme-hormone interrelationships in cellular metabolism. For two years Dr. Olson has been a research fellow and then an established investigator of the American Heart Association and director of the heart metabolism section, department of nutrition, at the Harvard School of Public Health, Boston. He is to receive his medical degree from Harvard in June of this year. Dr. Olson will not assume his duties on a full time basis at the University of Pittsburgh until July 1, 1952, but during the coming year he will supervise the installation of laboratory facilities and recruit key members of his staff.

TENNESSEE

Dr. Pride Made Professor Emeritus.—The University of Tennessee College of Medicine, Memphis, recently awarded Dr. William T. Pride the title of professor emeritus. Dr. Pride joined the faculty of the old College of Physicians and Surgeons in 1908 and had been professor of obstetrics and gynecology since 1933.

New Section on Clinical Chemistry.—Dempsie B. Morrison, Ph.D., associate professor of chemistry at the University of Tennessee Medical Units, Memphis, will be the director of the section of clinical chemistry to be established by the college of medicine this summer. The section is being established to enlarge both the teaching program of the college and the chemical diagnostic services to patients at John Gaston Hospital, the teaching hospital of the college. The section will be located on the second floor of the old pathology building in the rear of the hospital. The building will be remodeled as soon as the division of pathology and bacteriology moves into the new Institute of Pathology, about July 1.

WASHINGTON

Institute for Study of Acohol.—The first Northwest Institute for the Scientific Study of Alcohol will be held June 11-15 in Guggenheim Hall at the University of Washington School of Medicine, Seattle. A special medical seminar on problems of alcohol will be held June 13 for practicing physicians. Dr. Andrew C. Ivy, vice president of the University of Illinois in charge of Chicago Professional Colleges, and Elvin M. Jellinek, Sc.D., dean of the Yale Institute of Alcohol Studies in the Southwest, Texas Christian University, Dallas, will speak. Physicians may register either for the entire institute or for the seminar. Other visiting lecturers will be: Dr. Haven Emerson, New York; Leon A. Greenberg, Ph.D., New Haven, Conn.; William R. McKay, Los Angeles, and Capt. James D. Whitall, Philadelphia. The fee for the entire institute is $15 and for the medical seminar only $5.

GENERAL

Today's Health Wins Award.—*Today's Health*, published by the American Medical Association, was one of six general magazines to be voted the National Safety Council's Public Interest Award for 1950 in recognition of exceptional service to safety. During the year the magazine carried 17 major articles on safety, eight separate items, and in March inaugurated a regular monthly feature, "First Aid." The publication received the same award in 1949.

Rocky Mountain Spotted Fever.—Rocky Mountain spotted fever in the mountain and Pacific states in the past has appeared in March and has reached a peak in May or June. In the five-year period 1933-37 the average number of cases reported in March was 11 and in April 45. In the five-year period 1940-44 the average number of cases in March and April was six and 29, respectively. In March of the present year only one case was reported, and in April none was reported in these groups of states. The disease appears and reaches a peak one to two months later in the eastern part of the country.

Society of Biological Psychiatry.—This society will hold its annual meeting at the Trimble Hall in the Hotel Claridge in Atlantic City, N. J., June 17. Papers to be delivered by invitation include:

Clarence W. Olsen, Beverly Hills, Calif., Relationship Between Psychoses and Visceral Crises.
William J. Grace and David T. Graham, New York, Specificity of the Relation Between Attitudes and Diseases.
N. Dorin Ischlondsky, New York, Brain Dynamics and Psychic Activity.
Charles M. Pomerat, Chicago, Tissue Culture of the Human Brain.

The president's reception and dinner will be held at 6 p. m. for physicians and invited guests. The evening's session will be a symposium on the anatomy and physiology of thought processes.

International Congress of Allergy.—The first International Congress of the International Association of Allergists will meet in Zurich, Switzerland, Sept. 23-29. Topics under discussion include: nature and social importance of the allergic diseases, histology of the allergic lesion, chemical and serological aspects of allergy, influence of constitution and heredity on the manifestation of allergic diseases, pharmacology of allergic reactions, and diagnosis of allergic diseases. The congress will be followed on Oct. 1 and 2 by a symposium, "The Influence of the Pituitary Gland and Adrenal Cortex on Biological Reactions," which has been arranged by the Swiss Academy of Medical Sciences. The general secretary of the congress is Dr. A. S. Grumbach, Institute of Hygiene, Zurich.

International Congress of Anesthesiology.—An International Congress of Anesthesiology, organized by the French Association of Studies on Anesthesia and Anesthesiology under the patronage of the Council on Coordination of International Congresses of Medical Sciences, will be held in Paris Sept. 20-22 at the Nursing School of the Salpetriere, 47 Boul. de l'Hospital. The congress will be open to all persons interested in anesthesia. The scientific program includes:

M. Cara, Paris, Graphic Recording of Physiological Functions in the Course of Anesthesia.
M. Van de Walle, Louvain, Natural Curare Derivatives.
M. Bovet, Rome, and M. Huguenaud, Paris, Synthetic Curare Compounds; Theoretical Report; Clinical Application.
M. Thalheimer, Paris, Establishment of an International Movement of Study on Anesthesiology.

Information as to registration may be obtained from the office of the secretary of the congress, 12 Rue de Seine, Paris 6e, France.

Society Elections.—The American Society for Clinical Investigation at its meeting April 30 elected Dr. W. Barry Wood Jr., St. Louis, president; Dr. Charles A. Janeway, Boston, vice president, and Dr. William M. M. Kirby, San Francisco, secretary-treasurer.——The Council of New England State Medical Societies at their April meeting elected Dr. Joseph H. Howard, Connecticut, president; Dr. Deering G. Smith, New Hampshire, vice president, and Dr. Creighton Barker, Connecticut, executive secretary-tresaurer.——At the meeting of the American Academy of Neurology at Virginia Beach on

April 11 and 12 Dr. Pearce Bailey of Washington, D. C., became president. Newly elected officers include: Dr. Howard D. Fabing of Cincinnati, president-elect; Dr. Walter O. Klingman, Charlottesville, Va., vice president; Dr. Joe R. Brown, Minneapolis, treasurer, and Dr. Francis M. Forster, Washington, D. C., secretary. The 1952 meeting will be held in the Brown Hotel, Louisville, April 24 and 25. Next year the two-day course in neuropathology instituted this year will be given again and also a course in neuroroentgenography and electroencephalography. Requests for papers on the program are to be sent to Dr. Alexander T. Ross at the University of Indiana School of Medicine, Indianapolis. Requests must be accompanied by a title and an abstract. The deadline for this is November 1.

Rehabilitation Meeting.—The Association for Physical and Mental Rehabilitation will hold its fifth annual national convention July 3-6 in Los Angeles. The scientific and clinical sessions, to be held at the Hollywood Roosevelt Hotel in Hollywood, tentatively include Dr. Edward D. Greenwood, Menninger Foundation, Topeka, Kan.; Dr. Alvin B. C. Knudson and Dr. John E. Davis, Veterans Administration central office, Washington, D. C.; Dr. Tracy J. Putnam, Beverly Hills, Calif.; representatives from the surgeon general's office of the armed forces, and rehabilitation specialists from the University of California School of Medicine at Los Angeles, the Kabat-Kaiser Institute, Santa Monica, Calif., and a number of hospitals throughout the country. These meetings will provide an opportunity for hospital therapists and rehabilitation workers to discuss trends and research findings in medical rehabilitation. Information may be obtained from the convention chairman, Mr. Burt S. Zachary, Neuropsychiatric Hospital, Los Angeles 25, or the national president, Mr. George Devins, Veterans Administration Hospital, Long Beach, Calif.

Poliomyelitis Training Courses.—The National Foundation for Infantile Paralysis has listed the following training centers that have scheduled short courses for physicians in the treatment of poliomyelitis patients.

Children's Medical Center, Boston, Dr. William T. Green, director, June 4-8, Aug. 6-10.

D. T. Watson School of Physiatrics, Leetsdale, Pa., Dr. Jessie Wright, director, six-day courses, dates to be arranged according to number and time of applications.

Georgia Warm Springs Foundation, Warm Springs, Ga., Dr. Robert L. Bennett, director, one-week course starting the first week in July and October.

Orthopaedic Hospital, Los Angeles, Dr. Charles L. Lowman, director, May 21-24, Oct. 22-25.

Stanford University School of Medicine, San Francisco, Dr. William H. Northway, director, one course scheduled in the summer, probably in June.

University of Colorado Medical Center, Denver, Dr. Winona G. Campbell, director, May 7-9, poliomyelitis; Dec. 13-15, postgraduate course in poliomyelitis in conjunction with other pediatric problems.

Enrollment must be arranged directly with the training center. Physicians who need financial assistance to attend these polio courses should contact their local chapters of the national foundation.

CANADA

Annual Canadian Medical Meeting.—The Canadian Medical Association will hold its annual meeting in Montreal June 18-22 under the presidency of Dr. Norman H. Gosse of Halifax. A series of roundtable conferences have been arranged for Wednesday, Thursday and Friday mornings, to be followed by general sessions. Visiting speakers include, Drs. Donald C. Balfour, Rochester, Minn.; Chester S. Keefer, Boston and Charles P. Bailey, Philadelphia. Sectional meetings will be held during the afternoons. A color television program will be shown Wednesday, Thursday and Friday afternoons. A program of entertainment has been planned for the doctors' wives.

Graduate Course in Allergy.—This course will be offered by the American Academy of Allergy June 14-16 in Montreal, under the sponsorship of the Faculty of Medicine, McGill University, and will be given in the Royal Victoria Hospital. Any interested physician in the United States or Canada may attend. The fee is $40. Applications may be sent to Dr. Bram Rose at the hospital, Montreal 2, Canada. Sixteen speakers will present the course. Nine are on the university faculty: Drs. Bram Rose, John S. L. Browne, William J. McNally, Joseph A. P. Pare, G. Lyman Duff, Harry L. Bacal, H. S. Mitchell, Dr. Karl K. Pump, and Eric Wittkower; from Columbia University College of Physicians and Surgeons, New York, Elvin A. Kabat, Ph.D., and Dr. William B. Sherman. Other speakers are Dr. Hans Selye, University of Montreal; Dr. John D. L. Fitzgerald, University of Toronto; Charles H. Walton, University of Manitoba, and Rubin Gdoli, Brooklyn. In addition to general allergy subjects there will be lectures on Oto-Rhinology in Relation to Allergy, Allergic Dermatoses, Allergy in Children, and Psychiatric Aspects in Allergy.

CORRECTION

Faculty Promotions at Temple University.—Dr. John Lansbury was promoted from associate professor to clinical professor of medicine at Temple University School of Medicine, Philadelphia, not from clinical professor to professor of medicine as was stated in THE JOURNAL Feb. 3, page 333.

MEETINGS

AMERICAN MEDICAL ASSOCIATION, Atlantic City, June 11 to 15. Dr. George F. Lull, 535 N. Dearborn St., Chicago 10, Secretary.

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AMERICAN ASSOCIATION FOR THE STUDY OF NEOPLASTIC DISEASES, St. Agnes Hospital, Baltimore, June 7-9. Dr. Eugene R. Whitmore, 2139 Wyoming Ave. N. W., Washington 8, D. C., Secretary.

AMERICAN COLLEGE OF CHEST PHYSICIANS, Atlantic City, June 7-10. Mr. Murray Kornfeld, 500 N. Dearborn St., Chicago 10, Executive Secretary.

AMERICAN COLLEGE OF RADIOLOGY, Atlantic City, June 10. Mr. W. C. Stronach, 20 N. Wacker Drive, Chicago 6, Executive Secretary.

AMERICAN DIABETES ASSOCIATION, Chalfonte-Haddon Hall, Atlantic City, June 9-10. Dr. John A. Reed, 11 W. 42d St., New York 18, Secretary.

AMERICAN ELECTROENCEPHALOGRAPHIC SOCIETY, Hotel Claridge, Atlantic City, June 16-17. Dr. John A. Abbott, Massachusetts General Hospital, Boston 14, Secretary.

AMERICAN GASTRO-ENTEROLOGICAL ASSOCIATION, Atlantic City, June 8-9. Dr. Dwight L. Wilbur, 655 Sutter St., San Francisco 2, Secretary.

AMERICAN GERIATRICS SOCIETY, Hotel Brighton, Atlantic City, June 7-9. Dr. Malford W. Thewlis, 25 Mechanic St., Wakefield, R. I., Secretary.

AMERICAN HEARING SOCIETY, Palmer House, Chicago, June 29. Mrs. Frances E. Lee, 817 Fourteenth St. N.W., Washington 5, D. C., Secretary.

AMERICAN MEDICAL WOMEN'S ASSOCIATION, Hotel Dennis, Atlantic City, June 9-10. Dr. Mildred C. J. Pfeiffer, Woman's Medical College of Pennsylvania, Philadelphia 29, Secretary.

AMERICAN NEUROLOGICAL ASSOCIATION, Atlantic City, June 18-20. Dr. H. Houston Merritt, 710 W. 168th St., New York 32, Secretary.

AMERICAN OPHTHALMOLOGICAL SOCIETY, The Greenbrier, White Sulphur Springs, W. Va., June 7-9. Dr. Maynard C. Wheeler, 30 W. 59th St., New York 19, Secretary.

AMERICAN ORTHOPEDIC ASSOCIATION, The Greenbrier, White Sulphur Springs, W. Va., June 20-23. Dr. C. Leslie Mitchell, Henry Ford Hospital, Detroit 2, Secretary.

AMERICAN PROCTOLOGIC SOCIETY, Atlantic City, June 7-10. Dr. W. Wendell Green, 1838 Parkwood Ave., Toledo 2, Ohio, Secretary.

AMERICAN RADIUM SOCIETY, Atlantic City, June 6-9. Dr. John Wirth, U. S. Marine Hospital, Baltimore, Secretary.

AMERICAN RHEUMATISM ASSOCIATION, Hotel Dennis, Atlantic City, June 8-9. Dr. Charles Ragan, 620 W. 168th St., New York 32, Secretary.

AMERICAN SOCIETY FOR THE STUDY OF STERILITY, Ritz-Carlton Hotel, Atlantic City, June 9-10. Dr. John O. Haman, 490 Post St., San Francisco 2, Secretary.

AMERICAN THERAPEUTIC SOCIETY, Atlantic City, June 8-10. Dr. Oscar B. Hunter, 915 Nineteenth St. N.W., Washington 6, D. C., Secretary.

ASSOCIATION FOR THE STUDY OF INTERNAL SECRETIONS, Chalfonte-Haddon Hall, Atlantic City, June 7-9. Dr. Henry H. Turner, 1200 N. Walker St., Oklahoma City 3, Secretary.

CATHOLIC HOSPITAL ASSOCIATION OF THE UNITED STATES AND CANADA, Convention Hall, Philadelphia, June 2-5. Mr. M. R. Kneifl, 1402 S. Grand Blvd., St. Louis 4, Executive Secretary.

CONFERENCE OF PRESIDENTS AND OTHER OFFICERS OF STATE MEDICAL ASSOCIATIONS, Hotel Traymore, Atlantic City, June 10. Mr. John E. Farrel, 106 Francis St., Providence 3, R. I., Secretary.

GREAT FALLS MEDICAL-SURGICAL CONFERENCE, Great Falls, Montana, June 25-26. Dr. William E. Sullens, Box 1066, Great Falls, Chairman.

IDAHO STATE MEDICAL ASSOCIATION, Sun Valley, June 17-20. Dr. Robert S. McKean, 305 Sun Building, Boise, Secretary.

MAINE MEDICAL ASSOCIATION, Poland Spring House, Poland Spring, June 17-19. Dr. Frederick R. Carter, 142 High St., Portland 3, Secretary.

MEDICAL LIBRARY ASSOCIATION, Denver, June 28-30. Miss Caroline Riechers, Rush Medical College Library, 1758 W. Harrison St., Chicago 12, Secretary.

NATIONAL PROCTOLOGIC ASSOCIATION, Madison Hotel, Atlantic City, June 9. Dr. George E. Mueller, 1214 W. Beach Blvd., Biloxi, Miss., Executive Secretary.

POST GRADUATE MEDICAL ASSEMBLY OF SOUTH TEXAS, Shamrock Hotel, Houston, Texas, July 23-25. Mrs. W. H. Dahme, 229 Medical Arts Bldg., Houston, Executive Secretary.

SOCIETY FOR INVESTIGATIVE DERMATOLOGY, Ritz-Carlton Hotel, Atlantic City, June 7-8. Dr. Herman Beerman, 255 S. 17th St., Philadelphia, Secretary

SOCIETY FOR VASCULAR SURGERY, Chalfonte-Haddon Hall, Atlantic City, June 10. Dr. George D. Lilly, 333 Ingraham Bldg., Miami 32, Fla., Secretary.

SOCIETY OF BIOLOGICAL PSYCHIATRY, Claridge Hotel, Atlantic City, June 17. Dr. George N. Thompson, 1136 W. Sixth St., Los Angeles 17, Secretary.

SOUTH DAKOTA STATE MEDICAL ASSOCIATION, Aberdeen, June 2-6. Dr. Roland G. Mayer, 22½ S. Main St., Aberdeen, Secretary.

WEST VIRGINIA STATE MEDICAL ASSOCIATION, The Greenbrier, White Sulphur Springs, July 19-21. Mr. Charles Lively, 1031 Quarrier St., Charleston 24, Executive Secretary.

INTERNATIONAL

EUROPEAN CONGRESS ON RHEUMATISM, Barcelona, Spain, Sept. 24-27. Dr. Gunnar Edström, Lund, Sweden, Secretary.

GENERAL PRACTITIONERS STUDY CLUB INTERNATIONAL, Rome, Italy, Sept. 12-15. Dr. John O'Connell, 10300 Lackland Road, St. Louis 14, Mo., U. S. A., President.

INTERNATIONAL ACADEMY OF PROCTOLOGY, Atlantic City, N. J., U. S. A., June 7-8. Dr. Alfred J. Cantor, 43-45 Kissena Blvd., Flushing, New York, Secretary.

INTERNATIONAL ANESTHESIA RESEARCH SOCIETY, London, England, Sept. 3-7. Mr. R. W. Cope, University College Hospital, London W.C.1, England.

INTERNATIONAL ASSOCIATION OF ALLERGISTS, Zurich, Switzerland, Sept. 23-29. Prof. A. S. Grumbach, Hygiene Institut der Universitaet Zurich, Gloriastr. 32, Zurich, Switzerland.

INTERNATIONAL CONGRESS OF ANESTHESIOLOGY, Nursing School of the Salpiettre, 47 Boul de l'Hospital, Paris, France, Sept 20-22. 12 rue de Seine, Paris 6e, France, Secretariat.

INTERNATIONAL CONGRESS OF CLINICAL PATHOLOGY, London, England, July 16-20. Dr. W. H. McMenemey, Maida Vale Hospital for Nervous Diseases, London W.9, England, Secretary.

INTERNATIONAL CONGRESS OF GYNECOLOGY, Maison de la Chimie, Centre Marcellin, Paris, France, June 23-29. Dr. Maurice Fabre, 1, rue Jules-Lefebvre, Paris IX, General Secretary.

INTERNATIONAL CONGRESS ON INDUSTRIAL MEDICINE, Instituto Superior Técnico, Lisbon, Portugal, Sept. 9-15. Dr. Luis Guerreiro, Instituto Nacional do Trabalho e Previdência, Praça do Comercio, Lisbon, Secretary General.

INTERNATIONAL CONGRESS ON MENTAL HEALTH, Mexico City, Mexico, Dec. 11-19.

INTERNATIONAL CONGRESS OF MILITARY MEDICINE AND PHARMACY, Paris, France, June 17-23. Physician General Dutrey, 8, bis, rue de Recollets, Paris X, Secretary General.

INTERNATIONAL EXHIBITION OF MEDICAL ARTS, Turin, Italy, May 30 June 12. Prof. S. Teneff, Palazzo della Exposizioni al Valentino, Turino, Italy.

INTERNATIONAL GERONTOLOGICAL CONGRESS, Hotel Jefferson, St. Louis, Mo., U. S. A., Sept. 9-14. Dr. John E. Kirk, 5600 Arsenal Street, St. Louis 9, Mo., Chairman, Program Committee.

INTERNATIONAL HOSPITAL CONGRESS, Brussels, Belgium, July 15-21. Capt. J. E. Stone, 10 Old Jewry, London E.C., England, Secretary.

INTERNATIONAL POLIOMYELITIS CONGRESS, Copenhagen, Denmark, Sept. 3-7. Prof. Dr. Niels Bohr, Statens Seruminstitut, 80 Amager Blvd., Copenhagen S., Denmark, President.

INTERNATIONAL SOCIETY OF ANGIOLOGY, Claridge Hotel, Atlantic City, N. J., U. S. A., June 9. Dr. Henry Haimovici, 105 E. 90th St., New York 28, Secretary.

INTERNATIONAL SOCIETY OF SURGERY, Paris, France, Sept. 24-29. Dr. L. Dejardin, 141, rue Belliard, Brussels, Belgium, Secretary General.

INTERNATIONAL SOCIETY FOR THE WELFARE OF CRIPPLES, Fifth World Congress, Stockholm, Sweden, Sept. 9-14. Mr. Donald V. Wilson, 54 E. 64th St., New York 21, N. Y., U. S. A., Executive Director.

PAN PACIFIC SURGICAL ASSOCIATION CONGRESS, Honolulu, Hawaii, Nov. 7-19. Dr. Forrest J Pinkerton, Suite 7, Young Bldg., Honolulu, Hawaii, President.

STUDENTS' INTERNATIONAL CLINICAL CONGRESS, Leyden, Utrecht, Groningen and Amsterdam, Holland, July 10-28. N. A. M. Bergstein, Oude Gracht 143 bis, Utrecht, Holland, Secretary General.

WORLD CONFEDERATION FOR PHYSICIAL THERAPY, Copenhagen, Denmark, Sept. 7-8.

WORLD MEDICAL ASSOCIATION, Stockholm, Sweden, Sept. 15-21. Dr. Louis H. Bauer, 2 E. 103d St., New York 29, N. Y., U. S. A., Secretary-General.

EXAMINATIONS AND LICENSURE

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: *Parts I and II.* Various Centers. June 18-20, Sept. 5-7 (Part I only). Applications must be filed at least thirty days prior to an examination. Ex. Sec., Mr. E. S. Elwood, 225 S. 15th Street, Philadelphia.

INTERNATIONAL COLLEGE OF SURGEONS

Examinations for Certified Fellowship in the United States Chapter in Urologic Surgery, Obstetrics and Gynecology and Proctologic Surgery, Chicago, June 1-2. Examinations will be given in General and Orthopedic Surgery, Chicago, Aug. 3-4. Sec., Dr. Arnold S. Jackson, 1516 Lake Shore Drive, Chicago 10.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Written.* July 20. Given simultaneously in several cities in the United States. Final date for filing application was Jan. 20. *Oral.* Memphis, Oct. 14-17. *Written.* July 18, 1952, Various locations. Final date for filing applications is Jan. 18, 1952. Sec., Dr. Curtiss B. Hickcox, 80 Seymour St., Hartford 15, Conn.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Oral.* New York, June 8-10. Sec., Dr. George M. Lewis, 66 East 66th St., New York 21, N. Y.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written.* Various centers, Oct. 15. Final date for filing applications was May 1. *Oral.* The schedule of oral examinations for 1951 has been arranged on a regional basis as follows: June, includes candidates from Beirut, Canada, Canal Zone, Connecticut, Delaware, District of Columbia, Maryland, New Jersey, Ohio, Pennsylvania, Puerto Rico, Rhode Island, Virginia and West Virginia. New York, date to be announced, covering Maine, Massachusetts, New Hampshire, New York and Vermont. San Francisco, date to be announced, covering Arizona, California, Colorado, Idaho, Montana, New Mexico, Oregon, Utah and Washington.

Only candidates who have not taken an oral examination can be admitted under the schedule arranged thus far.

Dates of closing dates for the filing of applications for examinations in New York and San Francisco to be announced.

Oral examinations in the subspecialties will be held at the same time and place and on the same distribution.

Exec. Sec., Dr. William A. Werrell, 1 West Main Street, Madison 3.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: *Oral.* Chicago, Oct. 25-26. *Oral.* Chicago, May 1952. Final date for filing applications for the May 1952 examination is Jan. 1, 1952. Sec., Dr. W. J. German, 789 Howard Ave., New Haven 4, Conn.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Written.* Feb. 1, 1952. Final date for filing applications is Nov 1. Sec., Dr. Paul Titus, 1015 Highland Building, Pittsburgh 6, Pa.

AMERICAN BOARD OF OPHTHALMOLOGY: *Written.* Twenty-five centers, Feb. 4-5, 1952. *Oral.* New York, May 31-June 5; Chicago, October 8-13. Sec., Dr. Edwin B. Dunphy, 56 Ivie Road, Cape Cottage, Maine.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: Final date for filing applications for the 1952 Part II examinations is Aug. 15, 1951. Sec., Dr. Harry A. Sofield, 122 S. Michigan Ave., Chicago 3.

AMERICAN BOARD OF OTOLARYNGOLOGY: *Oral.* Chicago, Oct. 9-12. Sec., Dr. Dean M. Lierle, University Hospital, Iowa City.

AMERICAN BOARD OF PEDIATRICS: *Oral.* Detroit, June 8-10. Buffalo, Oct. 26-28. Ex. Sec., Dr. John McK. Mitchell, 6 Cushman Road, Rosemont, Pa.

AMERICAN BOARD OF PHYSICAL MEDICINE AND REHABILITATION: *Parts I and II.* Philadelphia, June 16-17. Final date for filing application was April 1. Sec., Dr. Robert L. Bennett, 30 N. Michigan Ave., Chicago.

AMERICAN BOARD OF PLASTIC SURGERY: *Oral and Written.* Chicago, June 4-6. Final date for filing application was March 15. Sec., Dr. Bradford Cannon, 330 Dartmouth St., Boston.

AMERICAN BOARD OF PREVENTIVE MEDICINE: *Written.* San Francisco, October 28. *Oral.* San Francisco, October 29. Sec., Dr. Ernest L. Stebbins, 615 North Wolfe St., Baltimore 5.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: Philadelphia, June 11-12. Final date for filing application was March 1. Sec., Dr. Francis J. Braceland, 102-110 Second Ave., S.W., Rochester, Minn.

AMERICAN BOARD OF RADIOLOGY: *Oral.* Atlantic City, June 5-9. Sec., Dr. B. R. Kirklin, 102-110 Second Ave., S.W., Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Written.* Various centers, Oct. 1951. Final date for filing applications is July 1. Sec., Dr. J. Stewart Rodman, 225 South 15th Street, Philadelphia.

BOARD OF THROACIC SURGERY: *Written.* Various parts of the country. Sept. 14, 1951. Final date for filing applications is July 15. Sec., Dr. William M. Tuttle, 1151 Taylor Ave., Detroit 2, Mich.

AMERICAN BOARD OF UROLOGY: Chicago, Feb. 9-13, 1952. Final date for filing applications is Sept. 1. Sec., Dr. Harry Culver, 314 Corn Exchange Bldg., Minneapolis 15.

DEATHS

Russell, William Logie ✦ New York; born in New Brunswick, Canada, July 24, 1863; University of the City of New York Medical Department, 1885; after several years of private practice in New York was appointed assistant physician at the Willard State Hospital, serving from 1897 to 1903, when he became medical inspector for the New York State Hospital Commission; in 1910 was appointed medical superintendent of the Long Island State Hospital; in 1911 went to White Plains, N. Y., as medical director of the New York Hospital-Westchester Division (then known as Bloomingdale Hospital); in 1926 was appointed general psychiatric director for the Society of the New York Hospital; participated in the planning for the New York Hospital-Cornell University Medical Center, devoting most of his time to the planning and organization of the Payne Whitney Psychiatric Clinic; retired in 1936; consultant in psychiatry at the Grasslands Hospital in Valhalla, New York Hospital, and to the Burke Foundation; emeritus professor of psychiatry at Cornell University Medical College; president of the American Psychiatric Association in 1931, New York Psychiatric Society in 1914 and 1915, and in 1919 president of the Medical Society of the County of Westchester; member of the National Committee for Mental Hygiene, of which he had been vice president, New York Society for Clinical Psychiatry, and the Association for Research in Nervous and Mental Diseases; fellow of the New York Academy of Medicine; member of the advisory committee to the National Institute of Mental Health of the U. S. Public Health Service; specialist certified by the American Board of Psychiatry and Neurology; in 1932 selected to give the Thomas W. Salmon Memorial Lectures for 1933; author of "A History of the Psychiatric Service of the New York Hospital," published in 1945; died in Santa Barbara, Calif., March 31, aged 87, of heart disease.

Smith, George Milton ✦ New Haven, Conn.; born in Hong Kong, China, July 5, 1879; Columbia University College of Physicians and Surgeons, New York, 1905; instructor in surgery at his alma mater, 1909-1910; research associate emeritus in anatomy at Yale University School of Medicine; formerly associate in pathology at Washington University Medical School in St. Louis, where he was associate pathologist to Washington University Hospital; for many years a member of the Connecticut Medical Examining Board and in 1943 president of the Connecticut State Medical Society; member of the New England Surgical Society, American Association of Anatomists, and the American Association of Pathologists and Bacteriologists; fellow of the American College of Surgeons; since 1947 special consultant to the National Advisory Cancer Council, of which he had been a member and executive director; at one time vice president of the American Society for the Control of Cancer; member of the Pathological Society of Great Britain and Ireland; corresponding member of the French Association for the Study of Cancer; member of the board of scientific advisors of the Jane Coffin Childs Memorial Fund for Medical Research; since 1933 director of the Anna Fuller Fund; trustee of the Bermuda Marine Biological Station; served overseas with the American Expeditionary Forces during World War I as a captain with a mobile unit; during World War II medical director of the Connecticut State Defense and Connecticut War Council; chairman of the subcommittee on armored vehicles of the National Research Council from 1942 to 1946; consultant to the Surgeon General of the U. S. Army from 1944 to 1946; medical director of the Scovill Manufacturing Company in Waterbury from 1920 to 1946; died in Pine Orchard February 26, aged 71, of arteriosclerotic hypertensive cardiac disease.

Lee, Walter Estell ✦ Philadelphia; born July 22, 1879; University of Pennsylvania Department of Medicine, Philadelphia, 1902; member of the founders group of the American Board of Surgery; emeritus professor of surgery at the Medico-Chirurgical College Graduate School of Medicine, University of Pennsylvania, where he was named associate professor of surgery in 1920, professor in 1925, and vice dean for surgery in 1935, holding both posts until he retired in 1946; for six years member of the Pennsylvania State Board of Medical Education and Licensure; served in France during World War I, where he went in 1915 with the Pennsylvania Hospital overseas unit; later served in the medical reserve corps of the U. S. Army and became a lieutenant colonel; member of the American Surgical Association, of which he was recorder from 1930 to 1946, Philadelphia Academy of Surgery, Philadelphia Pediatric Society, Philadelphia Pathological Society, Society of Clinical Surgery, American Association of Thoracic Surgery, Kappa Sigma, and Alpha Mu Pi Omega; fellow of the American College of Surgeons; consulting surgeon, Graduate Hospital of the University of Pennsylvania, Germantown Dispensary and Hospital, Pennsylvania and Children's hospitals in Philadelphia, Bryn Mawr (Pa.) Hospital and Burlington County Hospital in Mount Holly, N. J.; wrote many papers on medical and surgical subjects and, with Dr. F. T. Stewart, wrote a manual of surgery; co-editor of *Progressive Medicine* from 1919 to 1933 and chairman of the editorial board of the *Annals of Surgery* from 1935 to 1947; died April 5, aged 71.

Wood, Thomas Denison, Taunton, Mass.; born in Sycamore, Ill., Aug. 2, 1865; College of Physicians and Surgeons, medical department of Columbia College, New York, 1891; member of the American Medical Association and the Medical Society of the State of New York; fellow of the American Association for the Advancement of Science; professor of physical education at Columbia University from 1901 to 1927 and professor of health education from 1927 to 1932, when he became professor emeritus; chairman of the commission on the welfare of teachers, New York State Teachers' Association, from 1913 to 1916; proposed and was chairman for 27 years of the joint committee of the American Medical Association and the National Educational Association, which devoted itself to consideration of health problems in education and had been chairman emeritus since 1938; chairman of the health section of the International Federation of the Home and School from 1928 to 1936; chairman of the committee on the school child, White House Conference on Child Health and Protection from 1929 to 1932; died in Morton Hospital March 19, aged 85, of pneumonia.

Timberlake, Gideon ✦ St. Petersburg, Fla.; born in Charlottesville, Va., March 6, 1876; University of Virginia Department of Medicine, Charlottesville, 1902; a specialist certified by the American Board of Urology, of which he had been a founder; member of the American Urological Association; fellow of the American College of Surgeons; formerly practiced in Baltimore, where he was professor of urology at the University of Maryland School of Medicine and urologist to the University, St. Agnes, and Franklin Square hospitals, and surgeon to the Church Home and Infirmary and West Baltimore General hospitals; during World War I served as a major in the medical corps of the U. S. Army; organizer and director of the Army School of Urology at Fort Oglethorpe, Ga., in 1918, and later became chief of the department of urology at Walter Reed General Hospital in Washington, D. C.; consultant in urology to Veterans Administration Hospital in Bay Pines; member of the staff of Mound Park and St. Anthony's hospitals; consultant to the American Legion Hospital for Crippled Children; inventor of several urologic instruments; died March 1, aged 74, of pneumonia.

Silkworth, William Duncan, New York; born in Brooklyn July 22, 1877; University and Bellevue Hospital Medical College, New York, 1899; member of the American Medical Association; for many years medical superintendent of the Charles B. Towns Hospital; served at the Knickerbocker Hospital; formerly affiliated with the Neurological Institute of Presbyterian Hospital and the Beekman-Downtown Hospital; member of the psychiatric staff of the U. S. Army Hospital at Plattsburg, N. Y., during World War I; a trustee of the Alcoholic Foundation; died March 22, aged 77, of coronary occlusion.

✦ Indicates Fellow of the American Medical Association.

Abbott, William Richard ✦ Idaho Falls, Idaho; Rush Medical College, Chicago, 1929; fellow of the International College of Surgeons and American College of Surgeons; formerly physician of Bonneville County; served during World War II; affiliated with Idaho Falls Latter-Day Saints' Hospital, where he died March 19, aged 47, of coronary infarction.

Ahrens, Leo Charles, Florissant, Mo.; St. Louis University School of Medicine, 1908; died in St. Charles March 26, aged 70, of coronary occlusion, arteriosclerosis and uremia.

Anthony, Francis Wayland, Haverhill, Mass.; Harvard Medical School, Boston, 1888; member of the American Medical Association; formerly assistant medical examiner and medical examiner of the Fourth District; for many years on the staff of Hale Hospital, where he died March 27, aged 92, of contusion of the spine from a fall and arteriosclerotic heart disease.

Barrett, Omar H., Knightstown, Ind.; Medical College of Ohio, Cincinnati, 1884; died March 31, aged 91, of strangulated hernia and prostatic carcinoma.

Betts, James Alfred ✦ Easton, Pa.; Jefferson Medical College of Philadelphia, 1909; founder of Betts Private Hospital; died April 2, aged 75, of acute coronary occlusion.

Boon, Charles Lester, Washburn, Ill.; Chicago College of Medicine and Surgery, 1909; member of the American Medical Association; served two terms as president of the board of education of Washburn Township High School; died March 11, aged 67, of heart disease.

Bradford, Edward Burton, Port Norris, N. J.; Jefferson Medical College of Philadelphia, 1901; died in the Bridgeton (N. J.) Hospital March 19, aged 73, of cardiorenal disease.

Buck, Kathleen Loretto, Rochester, N. Y.; Trinity Medical College, Toronto, Canada, 1897; member of the American Medical Association; past president of the Women's Medical Society of New York State; for many years on the staff of St. Mary's Hospital; died March 21, aged 78, of bronchopneumonia.

Carriel, Henry B. ✦ Elgin, Ill.; Chicago Medical College, 1888; an Associate Fellow of the American Medical Association; member of the American Psychiatric Association; formerly superintendent of Jacksonville State Hospital and the Dixon (Ill.) State Hospital; formerly affiliated with Kankakee State and Elgin State hospitals; died April 1, aged 87.

Chipman, Rupert James, Portland, Ore.; McGill University Faculty of Medicine, Montreal, Canada, 1892; member of the American Medical Association; formerly member of the city board of health; medical examiner for Selective Service during World War II; died March 21, aged 82.

Cooper, Samuel Emerson, Water Valley, Miss.; University of Nashville (Tenn.) Medical Department, 1897; died in Memphis March 30, aged 77, of arteriosclerotic heart disease.

Craig, Albert James, Fort Washington, Pa.; Hahnemann Medical College and Hospital of Philadelphia, 1906; died March 18, aged 67, of coronary thrombosis.

Dolder, Felix Charles, Eyota, Minn.; Northwestern University Medical School, Chicago, 1903; member of the American Medical Association; died in Worrell Hospital, Rochester, Minn., March 19, aged 76, of coronary thrombosis.

Fackt, Marie Philipina, Denver; University of Colorado School of Medicine, Denver, 1936; certified by the National Board of Medical Examiners; died March 24, aged 58, of carcinoma of the breast.

Ginsberg, Edward Louis, Kansas City, Mo.; Kansas City Medical College, 1903; member of the American Medical Association; served as police surgeon; died March 11, aged 72, of coronary occlusion and hypertension.

Glaeser, Arthur Francis ✦ Buffalo; University of Buffalo School of Medicine, 1916; past president of the Erie County Medical Society; served overseas during World War I; diagnostician for the county health department; formerly city diagnostician; died in Fort Lauderdale, Fla., March 22, aged 56, of mesenteric thrombosis.

Hamblen, Robert North ✦ Spokane, Wash.; University of Pennsylvania School of Medicine, Philadelphia, 1909; member of the North Pacific Surgical Association; past president of the Spokane County Medical Society and Public Health League of Washington; formerly vice president of the Washington State Obstetrical Society; served in France during World War I; affiliated with St. Luke's Hospital, Sacred Heart Hospital and Deaconess Hospital, where he died March 18, aged 66, of coronary occlusion.

Hanks, George Wallace, Salt Lake City; Jefferson Medical College of Philadelphia, 1917; formerly associated with the U. S. Public Health Service; formerly affiliated with Veterans Administration Hospital in Bay Pines, Fla.; served during World Wars I and II; died March 15, aged 59, of amyotrophic lateral sclerosis.

Herrington, L. C., Terry, Miss.; Memphis Hospital Medical College, 1904; member of the American Medical Association; died in Baptist Hospital, Jackson, March 18, aged 70, of retroperitoneal adenocarcinoma.

Kerns, Francis John ✦ Newark, N J.; Georgetown University School of Medicine, Washington, D. C., 1903; past president of the Pathological Society of New Jersey; affiliated with St. Mary's Hospital in Orange and St. Michael's Hospital and Presbyterian Hospital, where he died March 23, aged 71, of cerebral thrombosis.

Knapp, John Christian ✦ Setauket, N. Y.; Albany (N. Y.) Medical College, 1916; specialist certified by the American Board of Radiology; member of the American College of Radiology; for many years affiliated with St. John's Hospital in Brooklyn; on the staff of Mather Memorial Hospital in Port Jefferson; served overseas during World War I; died March 15, aged 57.

Langston, John Earl, Houston, Texas; Baylor University College of Medicine, Dallas, 1916; member of the American Medical Association, died in March, aged 62, of suffocation and burns.

Lawson, Claudius Simuel, Fairmont, W. Va.; Medical College of Virginia, Richmond, 1910; member of the American Medical Association; died March 22, aged 71, of injuries suffered in an automobile accident.

Ledbetter, Franklin Carver, Greenville, S. C.; Southern College of Medicine and Surgery, Atlanta, 1914; member of the American Medical Association; died March 2, aged 61, of acute coronary occlusion.

Leonard, Bertram Bryant Jr., Yankton, S. D.; State University of Iowa College of Medicine, Iowa City, 1927; member of the American Medical Association; affiliated with Sacred Heart Hospital; died March 28, aged 49, of heart disease.

Long, Merrill Harrison ✦ Altoona, Pa.; Hahnemann Medical College and Hospital of Philadelphia, 1921; affiliated with Altoona and Mercy hospitals; died March 18, aged 53, of diabetes mellitus and pneumonia.

Lowe, William Cook, Queenstown, Md.; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1941; served during World War II; died February 3, aged 33.

Lyda, Edwin Earle, San Bernardino, Calif.; St. Louis University School of Medicine, 1941; member of the American Medical Association; affiliated with St. Bernardino's Hospital, where he died March 15, aged 37, of bronchopneumonia, cerebral infarcts, bacterial endocarditis and thrombophlebitis.

McAdams, Edward Calvin ✦ Wilkinsburg, Pa.; University of Pittsburgh School of Medicine, 1909; served as a visiting physician at Columbia and Western Pennsylvania hospitals and on the staff of St. Joseph's Hospital; died March 12, aged 67, of uremia.

McCandless, Oliver Howard, Independence, Mo.; University Medical College of Kansas City, 1901; specialist certified by the American Board of Radiology; member of the Radiological Society of North America, American Medical Association, and the American College of Radiology; served on the staff of the Independence Sanitarium and Hospital, where he died May 2, aged 75, of carcinoma of the stomach.

McClure, John B., Marietta, Ohio; Medical College of Ohio, Cincinnati, 1896; for many years health commissioner; coroner; affiliated with Marietta Memorial Hospital, where he died March 30, aged 79, of cerebral thrombosis.

McDermott, William Carlton, Peoria, Ill.; Chicago Medical School, 1940; member of the American Medical Association; clinician to the city health department; affiliated with St. Francis Hospital, where he died March 27, aged 40, of uremia, rheumatic heart disease, and pneumonia.

McLandress, Joshua Alexander ✠ Saginaw, Mich.; Saginaw Valley Medical College, 1902; affiliated with St. Luke's Hospital, St. Mary's Hospital, and the Saginaw General Hospital, where he died March 20, aged 73, of cerebral thrombosis.

McLean, Ray Allyn, Fayette, Iowa; State University of Iowa College of Medicine, Iowa City, 1906; died March 27, aged 73, of heart disease.

McMechen, Harry B., Hannibal, Mo.; Meharry Medical College, Nashville, Tenn., 1911; died April 3, aged 64, of coronary thrombosis.

McSorley, Frederick William, New York; Albany (N. Y.) Medical College, 1909; served during World War I; retired assistant medical director of the Equitable Life Assurance Society of the United States; died March 24, aged 67, of heart disease.

Maker, Louis Edward, Fort Collins, Colo.; Drake University Medical Department, Des Moines, Iowa, 1897; died February 1, aged 77, of cerebral hemorrhage.

Mallow, Edgar H., Columbus, Ohio; Medical College of Ohio, Cincinnati, 1900; died March 24, aged 76, of heart disease.

Mann, Sigmund, Oak Park, Ill.; Chicago College of Medicine and Surgery, 1916; died in the Albert Merritt Billings Hospital, Chicago, April 16, aged 65, of hemorrhagic infarction of the lung.

Mathis, James Edgar, Burns, Tenn.; University of Tennessee Medical Department, Nashville, 1889; died February 3, aged 84, of cerebral hemorrhage.

Miles, Bertram James, Wilkinsburg, Pa.; University of Pittsburgh School of Medicine, 1934; member of the American Medical Association and the American Association of Industrial Physicians and Surgeons; associate surgeon, Columbia Hospital; died March 15, aged 41, of cerebral hemorrhage.

Moore, George Washington, Cincinnati; Cincinnati College of Medicine and Surgery, 1895; died March 14, aged 82, of congestive heart failure and pulmonary edema.

Myers, Henry Dey Sr. ✠ Howells, Neb.; Drake University College of Medicine, Des Moines, 1906; chairman of the board of health and for many years member of the school board of Howells; died April 3, aged 72, of cerebro-vascular accident.

Payne, John Lewis, Cincinnati; Eclectic Medical College, 1899; formerly on the faculty of his alma mater; died in St. Francis Hospital March 12, aged 77, of cerebral hemorrhage.

Peters, Melvin Lester, Cameron, Mo.; University Medical College of Kansas City, 1905; served two terms as mayor of Cameron; died March 4, aged 78, of cerebral hemorrhage.

Petrik, Albert Charles, Fairhope, Ala.; University of Illinois College of Medicine, Chicago, 1930; member of the American Medical Association; served during World Wars I and II; died in the Veterans Administration Hospital, Montgomery, February 24, aged 55, of cerebral hemorrhage and hypertensive cardiovascular disease.

Pfletschinger, Frederic, New York; Columbia University College of Physicians and Surgeons, New York, 1902; member of the American Medical Association; affiliated with Lutheran Hospital, where he died March 18, aged 71, of arteriosclerotic heart disease.

Pfuner, Oskar, Livermore, Calif.; Albertus-Universität Medizinische Fakultät, Königsberg, Prussia, Germany, 1911; affiliated with Veterans Administration Hospital; died in Alta Bates Hospital, Berkeley, March 4, aged 66, of carcinoma.

Prince, Norman Call ✠ Amarillo, Texas; Denver and Gross College of Medicine, 1907; specialist certified by the American Board of Radiology; member of the Radiological Society of North America and the American College of Radiology; died February 23, aged 66.

Pyles, John Wylie ✠ New Martinsville, W. Va.; Jefferson Medical College of Philadelphia, 1926; member of the state legislature, 1937-1938; died in the Ohio Valley General Hospital, Wheeling, March 15, aged 50, of bronchopneumonia.

Radcliff, Ernest, Jonesboro, Ill.; Washington University School of Medicine, St. Louis, 1906; member of the American Medical Association; died March 17, aged 74.

Rainone, Michele, Brooklyn; St. Louis University School of Medicine, 1932; member of the American Medical Association; honorary lieutenant of the New York Police Department; for many years on the staff of the Swedish Hospital, died February 3, aged 48, of heart disease.

Rawlins, Elbert Van der Heyden, Roodhouse, Ill.; St. Louis University School of Medicine, 1904; died January 27, aged 76.

Razinsky, Louis ✠ Warren, Ohio; University and Bellevue Hospital Medical College, New York, 1931; specialist certified by the American Board of Internal Medicine; served in the European theater during World War II; affiliated with St. Josephs Riverside Hospital, where he died March 9, aged 44, of coronary thrombosis.

Reynolds, Clifton Johnson, Bluefield, W. Va.; University of Virginia Department of Medicine, Charlottesville, 1920; specialist certified by the American Board of Urology; member of the American Medical Association and American Urological Association; fellow of the American College of Surgeons; president of the section on urology of the West Virginia State Medical Association; affiliated with Bluefield Sanitarium; died March 24, aged 54, of heart disease.

Richards, Robert Milton, Detroit; Cleveland Medical College, Homeopathic, 1894; served on the staffs of the Grace and Harper hospitals; for many years house physician for the Statler Hotel; died March 17, aged 82, of coronary thrombosis.

Robbins, Charles Mortimer ✠ Newark, N. J.; University and Bellevue Hospital Medical College, New York, 1914; specialist certified by the American Board of Surgery; fellow of the International College of Surgeons and the American College of Surgeons; past president of the Academy of Medicine of Northern New Jersey; served during World War II; affiliated with Beth Israel, Presbyterian, and Irvington General hospitals; died April 4, aged 61.

Rodholm, Ansgar Kolhede ✠ Corpus Christi, Texas; University of Chicago School of Medicine, 1938; specialist certified by the American Board of Orthopaedic Surgery; served during World War II; affiliated with Spohn, Memorial, Ghormley Clinic, and Crippled Children's hospitals; died March 20, aged 44, of injuries received in an automobile accident.

Rozanski, Frank Stanley, Worcester, Mass.; Hahnemann Medical College and Hospital of Philadelphia, 1937; member of the American Medical Association; public school physician; served during World War II; on the courtesy staffs of St. Vincent and Fairlawn hospitals and the Hahnemann Hospital, where he died March 5, aged 37, of ruptured esophageal varices and cirrhosis of the liver.

Sage, Arthur Gray ✠ Buffalo; New York University Medical College, New York, 1898; on the staff of the Sisters of Charity and Deaconess hospitals; died March 30, aged 81, of coronary thrombosis.

Swann, Joseph Charles, Wedowee, Ala.; Atlanta Medical College, 1890; died February 20, aged 81, of hypostatic pneumonia, arteriosclerosis, and hypertension.

Tatum, William Jefferson, Richland, Ga.; Southern Medical College, Atlanta, 1896; died February 4, aged 78.

Thompson, Frederick E., Columbus, Ohio; Columbus Medical College, 1888; formerly practiced in Marengo, where he was a member of the Morrow County Board of Health; died March 24, aged 85.

GOVERNMENT SERVICES

DEPARTMENT OF DEFENSE

CREDIT FOR ATTENDANCE AT SESSIONS ON MILITARY MEDICINE AT ATLANTIC CITY SESSION

We have been informed that each medical officer who attends the Sessions on Military Medicine in the Section on Miscellaneous Topics at the Atlantic City Session and registers at the entrance to the Rennaisance Room of the Ambassador Hotel will receive one credit point for attendance at each of the half-day sessions. In other words, if such officer attends both meetings of the Sessions on Military Medicine, he will receive two credit points. If he attends only one, he will receive only one credit point.

PUBLIC HEALTH SERVICE

Industry Needs More Water.—The need of industry for greater supplies of usable water to meet the nation's defense production schedules was emphasized in discussions before the water pollution control advisory board of the Public Health Service, Federal Security Agency, in Washington, D. C., April 18 and 19. During the two-day session the board heard reports on the progress of the cooperative work by the states and the Public Health Service for development of comprehensive water pollution control programs, and on other activities in government and private fields bearing on the pollution problem. The board discussed prospects for sewage and industrial waste treatment plant construction. Arrangements are being made to take care of needs for water supply and sewage disposal plants pending designation of a claimant agency of the government for these functions.

The increased supply of water required by industry to fill defense orders was emphasized by a member of the board. The efforts of industry to increase its supplies of usable water by controlling pollution were described. Industry in the Philadelphia area is spending 25 million dollars to fight pollution, and individual companies are investing millions of dollars a year for treatment works and for research to prevent pollution by improving their "housekeeping practices."

In a review of the work of the President's Water Resources Policy Commission the seriousness of the situation was emphasized.

Laboratory and Field Training Courses.—One hundred and one laboratory and field training courses are being offered this year by the Public Health Service. All courses emphasize training personnel to maintain health services in defense and mobilization. The majority of courses are being conducted by the Communicable Disease Center, Atlanta, Ga. Ten courses will be given by the Environmental Health Center, Cincinnati. The training is primarily for employees of state and local health departments, but employees of nonprofit institutions are eligible. Over 450 foreign public health workers from 70 countries have attended these courses since the end of World War II.

Refresher courses in the principles and practice of laboratory methods for the diagnosis of disease are conducted in Atlanta and Chamblee, Ga., and in Montgomery, Ala. Field training courses in the environmental aspects of disease control are conducted under a cooperative federal-state program to develop more effective field training for all types of public health workers. These courses are held in Atlanta and also at regional training centers located in Amherst, Mass.; Buffalo; Pittsburgh; Bloomington, Ill.; Columbus, Ga.; Topeka, Kan., and Denver. Applicants must be approved by their state health officer. Additional information about the training may be obtained from the Communicable Disease Center.

Training in radiological health, water pollution abatement and milk and food sanitation is conducted by the Environmental Health Center. State and local health department employees should apply for training through their state health officer. Others should apply through the sponsoring agency. Additional information may be obtained from the Training Section, Environmental Health Center, 1014 Broadway, Cincinnati 2.

Training at Communicable Disease Center.—A group of 35 Public Health Service officers are at the Communicable Disease Center, Atlanta, for a month's special training before assignment to the Economic Cooperation Administration to staff public health projects of the special technical and economic mission in southeast Asia. Their training in Georgia will include malaria control, other insect-borne disease control, and rural sanitation. The group, all commissioned officers in the Public Health Service, includes physicians, entomologists, malariologists, nurses, sanitary engineers, sanitarians, and health educators.

Navy and army personnel currently are being trained at the Communicable Disease Center in milk and food sanitation, inspection and sanitary practices in eating places, water pollution control, emergency repair and establishment of water supplies, sewage and garbage disposal, and camp sanitation. In addition, insect and rodent training emphasizes the control of mosquitoes, flies, rodents, and other disease-carriers.

Twelve-week courses in these subjects have been given by CDC, in cooperation with navy instructors, at Annapolis, Md., for navy petty officers and state of Maryland sanitarians. Four-week courses covering the same fields have been given by CDC at Atlanta and Columbus, Ga., for selected army personnel attached to preventive medicine units. Similar training has been given for years by the Communicable Disease Center for its own and state and local health department personnel.

Study of Toxic Residues on Foods.—A western toxicology laboratory is being established jointly by the Communicable Disease Center of the Public Health Service and the State College of Washington's experiment station. The laboratory will be in Wenatchee, Wash., and its staff will include a medical officer, a biologist, and a chemist, as well as other personnel. The new research project was initiated to determine the public health hazards of toxic residues on foods. Little is known, it is pointed out, about the toxicity to humans of residues from the new poisons that have proved so effective in the control of insect pests. The purpose of the investigation is to determine if any injury results from the absorption of such residues over a long period of time. The first study to be made by the new laboratory will be an investigation of the hazards associated with the use of parathion and dichlorodiphenyltrichloroethane (DDT) in apple orchards, as well as the effects of other insecticidal sprays on fruits and vegetables.

Japanese Health Workers in Training.—Thirteen physicians and other health workers from Tokyo, Japan, have arrived in the United States for three months of training under programs supervised by the Division of International Health of the Public Health Service. The training is being conducted under a fellowship program arranged by the Military Government of Japan. Among the trainees are:

Dr. Kiyoshi Ando, chief of the First Bacteria Division, National Institute Health, who will study manufacture and assay of biologics production, especially toxin and antitoxin.

Dr. Junjiro Okanishi, director of the Koichikawa Health Center, who will review communicable disease control in small towns.

Dr. Takehisa Omura, chief of the National Sanatoria Section, Ministry of Welfare, who will study operation of tuberculosis sanatoriums.

Dr. Ken Yanagisawa, Chief of the Tuberculosis Division, National Institute of Health, who will review American tuberculosis control and research programs.

FOREIGN LETTERS

PARIS

Cortisone and Gestation.—Several years ago, Prof. Robert Courrier, general secretary to the Academy of Sciences, studied the influence of desoxycorticosterone on the gestation of rabbits. He found that this substance can replace the corpus luteum hormone; it allows the evolution of pregnancy in the castrated pregnant animal. Recently, in collaboration with Mme. Andrée Collonge, Professor Courrier studied the effect of cortisone on gestation. Rabbits were given daily injections of 25 mg. of cortisone acetate, dissolved in 1 cc. of an excipient, during four to seven days, between the 10th and the 23d days of gestation. This experiment gave the following results: Some rabbits aborted; with separation of the placenta; in others a hemorrhage occurred. When injections were given between the 10th and 14th days of pregnancy, autopsy revealed, besides living fetuses, evidences of resorbed ones; fetuses were diminished in size, from 24 to 20 mm., and placentas were pale. When injections were given between the 15th and the 21st days, all fetuses were found macerated, 15 to 38 mm. in size instead of 54 mm. (normal size), and ovarian yellow bodies were small and pale. The authors presented these results to the Academy of Sciences, March 19, 1951, and concluded by stating that cortisone has a deleterious effect on the gestation of rabbits, especially if injected after the 15th day of pregnancy.

Vitamin B_{12}.—P. L. Drouet, Wolff, Mme. Karlin and G. Rauber presented the results of their researches on vitamin B_{12} levels in human and animal liver "in vivo" to the Medical Society of the Paris Hospitals at the meeting of March 2, 1951. First, the authors studied these levels in the ox and found that they range from 0.5 to 1.5 gamma per gram of liver parenchyma. Having then taken samples from human corpses, they noted a level of 0.5 to 0.7 gamma per gram of body tissue. In six patients with multiple sclerosis, tuberculosis, chronic ethylism or hemolytic icterus, levels varied from 0.478 to 1.14 gamma. All these studies were made on fragments of hepatic tissue weighing 5 to 32 mg. and taken by biopsy puncture. This measurement of vitamin B_{12} levels was effected by a microbiologic process, with the use of a micro-organism (Lactobacillus) that requires for its growth the presence of vitamin B_{12} in the culture. By comparing the growth of organisms with that obtained in mediums containing a titrated solution of crystallized vitamin B_{12}, one can assess the vitamin B_{12} content of liver fragments. After these preliminary studies, which the authors described at a recent meeting of the Academy of Sciences, they studied the vitamin B_{12} hepatic levels in patients with pernicious anemia before and after treatment. In five patients, before treatment, a considerable fall of the hepatic vitamin B_{12} levels (0.023, 0.037, 0.041, 0.071, and 0.14 gamma) was noted; after treatment with an hepatic extract or vitamin B_{12} (30 to 50 gamma per day), there occurred a considerable rise in the hepatic vitamin B_{12} levels (0.068, 0.198, 0.17, 0.166, and 0.272 gamma); these levels were then two and even five times higher than previously. These first results of the researches give for the first time direct evidence in vivo of the role of liver in the physiopathology of pernicious anemia and also suggest research on other vitamins.

International Youth Center.—The official opening of this center, dedicated to "the first year of life," will take place April 19-July 15, 1951. The exhibit will cover (1) infantile mortality; historic evolution and present condition in various countries; mortality according to age and causes, especially during the first months of life; (2) various dangers threatening infants; (3) rachitism and premature weaning; (4) lack of maternal care; (5) sanitary and social protection of youth, and maternal and infantile protection, and (6) normal growth of infants. Conferences and movies will be included. Later, this exhibit will be presented in several large cities of France and foreign countries. The international center intends to organize other exhibits on other subjects relating to youth.

Death of Professor Jacques Roubinovich.—J. Roubinovich, well-known French psychiatrist, died at the age of 88. He was chief of the children's ward at Bicètre, having succeeded his master, Bourinville. His scientific works are numerous and cover various fields, such as alienation, progressive psychosis, melancholia, dementia precox, general paralysis, epilepsy, idiotism and tics. In all his work, he endeavored to discover the relations between psychic diseases and organic syndromes. He was vice president of the league for mental hygiene. He was also interested in juvenile delinquency, and, with Professor Heuyer, he advocated that juvenile offenders be routinely subjected to a medicopsychologic examination. Roubinovich had a strong personality, which he showed during the occupation of Paris by the Nazis. Arrested by them at the age of 80 and interned at the Rothschild Hospital, he sustained the courage of his companions.

ITALY

Cancer of the Rectum and Its Surgical Therapy.—In discussing the paper by Professor Bastianelli at the National Congress of Surgery (*J. A. M. A.* **146:**56 [May 5] 1951) Professor Paolucci, of Rome, reported on about 100 cases of cancer of the rectum treated by him in the past 12 years. Thirty-six of these underwent palliative intervention, while radical surgical intervention was performed in 70 patients. In 1932, at a meeting of Italian surgeons convened to discuss late results of surgery of cancer of the rectum, Professor Paolucci reported on about 30 surgically treated patients. Almost all the patients operated on by perineal approach had died from metastasis or local recurrence of the tumor. Of the patients operated on by abdominoperineal approach, a good percentage survived. He then became convinced that the only truly radical operation giving lasting satisfactory results was abdominoperineal intervention.

Paolucci concluded that the cause of the recurrences was the one stressed by Professor Bastianelli in his report, that the opening of the fascia propria of the rectum actually causes the spread of the tumor. Professor Paolucci admitted, also, that until some time ago he did not care to save the sphincter in those interventions, because he believed that the intervention should be as radical as possible or because the operation may be prolonged when the sphincter is preserved. He now concludes that the sphincter itself should be spared whenever possible.

Professor Ceccarelli, of Padua, stressed the great value of Professor Bastianelli's report, which included the results of his wide experience as a distinguished surgeon. Professor Ceccarelli's own cases of cancer of the rectum are limited to 51, in 17 of which resection was done by perineal approach and in 18 by the abdominoperineal route (Miles technique), while 15 patients were operated on by abdominoperineal approach with preservation of the sphincter, according to Bastianelli's technique. The speaker emphasized the importance of preoperative treatment. He performed resection in 39 cases, in which colostomy was well tolerated; two patients refused to undergo operation, not wishing to have an artificial anus. In 15 cases operated on with preservation of the sphincter, according to the method widely used by Bastianelli, the regular function of the intestine was preserved, which is of capital importance.

Professor Dogliotti, of Turin, stressed some fundamental points and reported on his present surgical procedures, different than those he followed in former years. In general, he is in favor of saving the sphincter in cases of cancer located in the upper part of the ampulla of the rectum and in cancer of the rectosigmoid. Lately, he performs an end to end anastomosis in suitable cases.

The abdominoperineal intervention of Miles gives satisfactory results for cancer of the ampulla. For low located cancer, he previously preferred resection by perineal approach with an artificial anus in the sacral region, but now he is inclined to use the abdominoperineal approach even in these cases.

The preoperative preparation of the patient is of greatest importance. It consists of administration of fluids and isotonic

The items in these letters are contributed by regular correspondents in the various foreign countries.

sodium chloride solution, blood transfusion and vitamins, evacuation of the intestines and use of antibiotics. Good nutrition of the loop undergoing anastomosis is also of particular importance, as well as the selection of an area in which pulsations of the arterioles may be clearly observed.

Interrupted sutures should be made with silk, in three layers; antibiotic powder should be dusted between the layers and on the exterior surface. The operative death rate registered was very small.

Oral Administration of Streptomycin.—At the Medico-Surgical Society of the Romagna, presided over by Professor De Castro, Professor Jasonni presented a report on the oral use of streptomycin in some infections of the intestine and of the biliary tract. He discussed the present knowledge of oral administration of this antibiotic, its insufficient absorption by this route, and the high concentration of streptomycin in intestinal excretion. It is possible to use streptomycin by oral route in some intestinal infections caused by very sensitive germs, and favorable results have been reported in acute gastroenterocolitis of infants and young children caused by Bacterium coli, Proteus vulgaris, Salmonella and other gram-negative organisms. More doubtful are the data on salmonellosis in adults, in which condition streptomycin is given orally by surgeons especially before operation on the large intestine, in order to eliminate the coli bacilli from the feces. In typhoid and paratyphoid, the effects were not very definite and are not comparable to those obtained with chloramphenicol.

After these preliminaries, based on a survey of the literature, Professor Jasonni reported the results obtained in his own cases. In enteritis of children, even when severe and refractory to other methods of treatment, oral streptomycin therapy proved definitely beneficial. Tolerance of adequate doses also has been gratifying in small children. In cases of acute enterocolitis of adults, accompanied sometimes by alarming gastrointestinal manifestations and by severe general repercussions, highly satisfactory results were obtained with oral administration of streptomycin. Streptomycin has been administered orally as an adjuvant to chloramphenicol therapy in seven cases of typhoid; seven recoveries were reported without recurrence, accompanied by a particularly rapid sterilization of the feces.

The results obtained by oral administration of streptomycin in some cases of infectious jaundice due to ascending angiocholitis are also interesting. Because of these favorable observations, the speaker proposes to try oral administration of streptomycin in ascending cholangitis due to micro-organisms especially sensitive to the antibiotic.

NORWAY

Care of the Aged.—The Norwegian National Association Against Tuberculosis and for Health was originally founded only for combating tuberculosis. The latter part of its present title is a comparatively late addition and is an indication that this rich and influential body has greater ambitions than fighting tuberculosis. One of the most recent digressions from tuberculosis is the welfare of the aged, for whom health control stations and consultative stations are soon to be established. The association is also prepared to stimulate and support scientific investigations concerning the health problems of the aged. It has also recently issued a pamphlet on the health of the aged, in which Dr. Per Hanssen outlines the principles to be followed. The municipal authorities in Oslo are now engaged on the provision of a new infirmary for the aged with some 400 beds in connection with the large Ullevaal city hospital. This infirmary will, it is hoped, be available for use in 1952. However, there will remain a need for some 800 more such beds for the aged. The Oslo medical society is taking an active part in welfare schemes for the aged; it recently organized a meeting at which the subject was discussed from various angles. If the age distribution of the population of the whole of Norway conforms to the calculations of the statisticians, the country will in 1975 have some 150,000 more pensioners and persons unfit for work than it has at the present time.

Paintings in Hospital Wards.—A small storm occurred recently when some doctors in Bergen declined an offer of paintings to be hung in their respective hospitals. Prof. Gabriel Langfeldt, who is in charge of the university psychiatric clinic in Oslo, circulated a questionnaire among his patients, who were given no time in which to consult each other and influence each other in the answers they gave. They were asked: 1. Do you like the pictures on the walls? 2. What effect do they have on you? Do they soothe you, cheer you, depress you, have no effect on you or are they repugnant to you? 3. Would you like some of the pictures to be removed? 4. If so, which? The answers to these questions showed that 62% of the patients liked the pictures and 25% did not like them, while 13% both liked and disliked them. The pictures had a soothing or cheering effect on 57%, no particular effect on 24% and a depressing or repugnant effect on 19%. The wish that all the pictures be removed was expressed by 16%, that none of them should be removed by 71% and that some of them should be removed by 13%.

It will thus be seen that most of these resident hospital patients approved of the pictures on their walls, finding them beneficial. But it was remarkable that, in as high a proportion as 19%, dislike of the pictures was expressed. These pictures were colored lithographs of modern painters, some of whose works were subjected to devastating criticism. Professor Langfeldt's reaction to this poll is to admit that there was some justification for the attitude of the hospital doctors in Bergen. He has decided to remove from the wards to the corridors of his hospital those pictures to which some of his patients objected. In their place he will hang peaceful landscapes and the like.

Better Remuneration for Junior Hospital Appointments.—Hitherto the pay of junior medical officers in hospital has been very meager. The hospital authorities recently have had to reconsider the situation in the light of a shortage of doctors, the younger generation of doctors having formed the Association of Junior Doctors, with Dr. Kaare Schanke as its chairman. A year ago the lowest paid intern received kr. 7,825, a senior intern kr. 9,825, and the chief's second in command, "the reserve doctor," kr. 11,825. The scale of remuneration was practically the same whether the hospitals belonged to a municipality or the state. The interns in the state hospitals had a pension scheme to which contribution was taken out of their salaries.

The Association of Junior Doctors is affiliated with the senior body, the Norwegian Medical Association, and is in a fairly strong position to bargain for its members. Negotiations last August between it and certain municipal authorities led to a stalemate. The doctors did not strike outright, but they did not apply for vacancies when they occurred on the old scale of remuneration. With the supply of new junior medical officers thus effectively cut off, it became obvious during last autumn that the position would be quite untenable for the hospitals at the beginning of 1951. Resumed negotiations led to a salary for the lowest paid intern of kr. 11,156 and a corresponding rise for the senior appointments.

Compulsory BCG Vaccination.—When, in 1947, the Norwegian parliament made BCG vaccination compulsory, the public health authorities in many other countries must have wondered whether this bold pioneer step would be successful. At a recent meeting of the Norwegian Medical Tuberculosis Society, Dr. S. Garegg of the tuberculosis department of the Oslo public health service quoted some figures which throw light on this subject. He was dealing with medical examinations of persons employed in industry. Altogether, 32,982 persons employed by 399 industrial concerns were subjected to mass radiography and tuberculin testing in 1949. In 81.7% a positive tuberculin reaction and in 18.3% a negative tuberculin reaction was observed. As great a proportion as 83.3% of the negative reactors consented to BCG vaccination. This percentage was only 42.5 in 1945, only 44.1 in 1946 and only 36.4 in 1947, the year in which BCG vaccination was made compulsory. The pressure put on negative reactors to accept BCG vaccination is of the persuasive order, and it may well be that many accept such vaccination not because they are forced against their will but because the fact of its being compulsory convinces them of its intrinsic merits. The figures just quoted may not necessarily be proof of the success of legislative compulsion, but they are at any rate suggestive of it.

CORRESPONDENCE

EVALUATION OF NEW DRUGS

To the Editor:—It is pertinent to keep the published record clear regarding the standards and ideals of scientists and physicians of the United States. Especially is this necessary in matters involving new and allegedly useful methods of handling disease. Distressing, therefore, is the spectacle of reputable scientific medical men promoting persuasive but dubious arguments and evidence on a material for use in cancer which has suspicious commercial association and on which satisfactory chemical analysis or pharmacological appraisal has not yet been issued in customary scientific or medical publications.

Those who would like to know what technical procedures are available for the reasonably satisfactory introduction of new therapeutic agents may refer to the following publications: "The Pharmacologic Evaluation of New Drugs" (*J. A. M. A.* **93:**1632 [Nov. 23] 1929); "Laboratory and Clinical Appraisal of New Drugs" (*J. A. M. A.* **126:**958 [Dec. 9] 1944); "Current Pharmacology: General Principles and Practical Clinical Application" (*J. A. M. A.* **138:**730 [Nov. 6] 1948), and the current issue of "New and Nonofficial Remedies."

It is a source of wonderment that respected scientific medical men interested in developing new therapeutic agents should neglect the suggestions offered in these publications.

CHAUNCEY D. LEAKE, Ph.D.,
Vice President,
University of Texas, for the
Medical Branch, Galveston.

MULTIPHASIC SCREENING

To the Editor:—I feel reasonably certain that Dr. Wilson G. Smillie would be greatly disappointed if nobody were to take issue with some of the thoughts expressed in his provocative article in the April 21, 1951, issue of THE JOURNAL. In my opinion, Dr. Smillie does an excellent job of presenting the pro's and con's of multiphasic screening, but the conclusions he reaches do not seem to follow logically from the premises he establishes. Any procedure which is relatively inexpensive and which will bring to light "27 to 47 cases of previously undetected serious pathological conditions" in every 1,000 persons examined, and a considerably larger number of less serious abnormalities, can hardly be characterized as "unsound in its concepts, untenable in its principles and indefensible in its logic."

If, as Dr. Smillie asserts, it is "a complete wastage of time and effort" to include chest x-ray examinations of school children in a screening survey, there is no reason why this particular procedure cannot be omitted, and the same can be said for cancer detection tests in persons under 35 years of age. All syphilologists do not share Dr. Smillie's lack of interest in serological tests in persons over 40 years of age.

One would hardly disagree with Dr. Smillie that it would be preferable for an individual to "see his physician first and . . . be referred by his physician to the health center for the various diagnostic aids." The simple fact is, as Dr. Smillie surely knows, that people do not go to their physicians for preventive services even when they have physicians to go to. Up until the time of the introduction of the "scare" influence of cancer detection examinations and the subsequent development of multiphasic screening programs, all efforts to have people submit to periodic or preventive examinations were a dismal failure. It seems to me that the important consideration is to find incipient disease through any practicable procedure and that the utilization of multiphasic techniques does not necessarily exclude private physicians from making what contributions they can to case finding and early diagnosis.

I agree with Dr. Smillie that it is important to avoid imparting a false sense of security to persons in whom no abnormalities are detected in a screening examination. It should be a simple matter to accomplish this through proper wording of the report.

Dr. Smillie very properly makes a plea for adequate medical care for everyone. Up to the present time, no completely satisfactory method of accomplishing this has been found, although great strides are being made. Until we arrive at the millenium, we should take full advantage of those measures that are available and practicable, even though they may not be perfect.

LEONARD J. GOLDWATER, M.D.,
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MISCELLANY

STATEMENT ON ANTIHISTAMINICS

By Committee on Public Health Relations of The New York Academy of Medicine

The Committee on Public Health Relations of The New York Academy of Medicine is concerned over the continued emphasis on the use of antihistaminic drugs for the prevention and treatment of the common cold. These drugs have been used successfully for several years by the medical profession for the treatment of allergic states. Studies of the common cold have shown that it is not due to a single cause. "Colds" may be caused by a variety of organisms and conditions. The symptoms vary with the cause, the season, the person's susceptibility, and many other factors. If these symptoms are caused by allergy, the antihistaminic drugs may give relief, but no known effect on a virus or bacterial invasion has yet been demonstrated. In evaluating reports that the antihistaminic drugs have stopped colds when taken within the first hour, it should be borne in mind that it is extremely difficult to judge within such a short time whether one actually has a cold. Again, colds may be so slight that they vanish within twenty-four or forty-eight hours without treatment. As a matter of fact, many persons who have been given placebos, or inert substances, instead of the antihistaminics have frequently done as well as those treated with the drugs, and sometimes even better.

The use of antihistaminic drugs is not without hazards. In some persons troublesome reactions occur. Fortunately, most of the reactions are mild; they may, however, have serious results. For example, the drugs may induce drowsiness or dizziness which may lead to accidents, particularly among drivers of automobiles, pilots of aircraft or operators of machinery, in whom efficiency and judgment may be temporarily impaired.

Severe reactions are not common, but they do occur, and their mechanism is not yet well understood. Children appear to be more susceptible to the drugs than adults, and are more subject to convulsions. Eight infants under two years of age are reported to have died from the effects of antihistamines, and several others are reported to have had convulsions. Most of these cases resulted from accidental overdosage. The ill effects of the antihistamines are most frequently exerted on the nervous system, but they have been known to affect the heart and the digestive tract, and there have been a few instances in which granulocytopenia, a serious disease in which the white blood cells are diminished, has been traced to these agents.

Packages of antihistaminic drugs sold to the public carry directions for dosage, but this is not sufficient protection against accidental overdosage or other hazardous use, especially in children. Allergists have estimated that at least 20 per cent of the people who take antihistamines in the doses recommended will experience undesirable if not dangerous reactions. Several persons are reported to have attempted suicide by taking excessive doses of antihistaminic drugs, and one succeeded.

Another hazard of the antihistaminic drugs as a cure for colds is that what may appear to be a "cold" is really the beginning of a serious infection and this may be neglected while the sick person is taking antihistamines on his own responsibility.

There have been cases of pneumonia in which antihistamines have been taken for several days before the real nature of the disease was discovered, and in this way valuable time for proper treatment of the disease has been lost.

It is the opinion of the Committee on Public Health Relations of The New York Academy of Medicine that the antihistaminic preparations are of no value in the treatment of true colds and that the public should be warned of the hazards attending their use.

MEDICAL MOTION PICTURES

The Migraine Headache: 16 mm., color, sound, showing time 22 minutes. Prepared by A. P. Friedman, M.D., Director, Headache Clinic, Montefiore Hospital, New York; Associate Professor, Neurology, College of Physicians and Surgeons; Regional Consultant, Veterans Administration. Produced in 1950 by Sturgis-Grant Productions, 314 East 46th St., New York 17. Procurable on loan from Sandoz Pharmaceuticals Inc., 552 West Lake St., Chicago 6.

This motion picture follows one patient from early childhood through to the present time, when she is about 22 years of age. Emphasis is placed on the various tests employed in the proper diagnosis of her vascular headache, such as the taking of a complete case history and physical and neurological examination. The method of treatment for aborting the acute attack with vasoconstrictors is also shown.

The film presents a somewhat distorted discussion of the etiology of migraine, since it leans so heavily on the psychosomatic aspects of the syndrome. Thus, the endocrine and allergic theories are given cavalier treatment, the eye is disregarded and the relation with epilepsy is ignored. Excellent animated sequences of the pathologic physiology of migraine are marred by the failure of the narration to deal with the vasoconstriction phase in any detail. The percentage of relief cited in the discussion of therapy is high and is the experience of a single investigator; this should be made clear or verified by other authority.

The use of both black and white and color film in this picture is not good technic, and the abstract sequence which illustrates an unstable personality is very confusing. Otherwise the photography, animation and narration are well done.

Feelings of Depression: No. 4 of Mental Mechanisms Series. 16 mm., black and white, sound, showing time 29 minutes. Prepared with the technical advice of the medical staff of the Allan Memorial Institute of Psychiatry, McGill University and the Royal Victoria Hospital, Montreal. Produced in 1950 by the National Film Board of Canada for the Mental Health Division of the Department of National Health and Welfare. Procurable from the National Film Board of Canada, 400 West Madison Street, Chicago, or 1270 Avenue of the Americas, New York 20.

This film tells the story of John Murray, a reserved hard-working and conscientious young man. The opening scene shows John rather upset about the loss of an important business account. He has feelings of guilt, is unable to concentrate, suffers from periods of despondency and believes that the business is going "on the rocks" because of his own shortcomings. His business associates and his wife are worried by his behavior. The narrator states that John's troubles lie within himself and date back to his early childhood.

John apparently had a happy childhood except for a few incidents, such as a feeling of rejection when his younger brother was born, his mother's annoyance at him for making noise when she became ill and the beating that his father gave him for fighting with Bob, his younger brother, over a snowhouse. After his mother dies, an aunt comes to live with them; she is neither understanding nor sympathetic toward his great emotional needs.

While John is in college, his father dies; he has to give up his ambition to become a writer. He takes over his father's business in order to send his younger brother to college, and Bob's success becomes his own. However, after Bob leaves town, writes a book and is married, John feels so completely alone that he becomes depressed; these events coincide with the loss of the important business account. John cannot admit to himself that he is jealous and resentful of Bob's greater success. Even though he is now happily married, he still does not feel that he deserves this happiness; he becomes a problem and a mystery to his wife and business associates. His difficulty lies far back in his emotional history. The world cannot see and John cannot allow himself to acknowledge his feelings of jealousy. Therefore, he becomes a victim of his conscience and cannot enjoy what he feels he does not deserve.

The presentation of the subject's life to illustrate the illness is very well done, and the effectiveness of the illustration is made stronger by opening with the climax of the subject's life experiences that have resulted in the present illness or depression. With the present illness in mind, the depiction of salient features in the individual's development are more meaningful to the viewer.

This motion picture is similar to others in the series. If taken with the other films, it is more understandable—alone it seems to go into the subject too abruptly, particularly for a nonpsychiatrically oriented audience. It is rather weak on the therapy side; treatment possibilities and the prognosis are mentioned only in passing. However, it is the best in the series.

The child's reaction to unpleasant experiences that are interpreted as rejection by him is vividly done. A weakness is in the gap between episodes in early childhood and early adulthood. Although it may be difficult to film events in the adolescent period, it would be helpful if some attention were given to these years, tying in developments in this period with those of early childhood and the present illness.

The film is suitable for medical students, medical society meetings, general practitioners, social workers, nursery school teachers and nurses. However, a psychiatrist should be present to lead a discussion to the interests of the group seeing the film and to point out the contributions that could be made by that particular group in preventive mental hygiene. The photography and narration are well done.

Laboratory Diagnosis of Influenza: 16 mm., black and white, sound, showing time 17 minutes. Produced in 1950 by and procurable on loan from Communicable Disease Center, 50 Seventh Street, N.E., Atlanta 5 or on purchase ($17.67) from United World Films, 1445 Park Avenue, New York 29.

The diagnosis of influenza consists of isolation of the virus (A, A′, or B) by inoculating chick embryos with washings of the nose and throat during the acute stage of the disease and of demonstration of immune antibodies in the blood about 10 days after onset. The technic of these tests is so lucidly and minutely presented that one gets a much better picture of all procedures than by reading and reviewing of illustrations. Step by step presentation, the emphasis of details, the use of diagrams and closeups, and good narration all contribute to make the viewing of this film a worth while educational experience of special interest to virologists, bacteriologists, public health and general laboratory technicians, medical students and all others who may be interested in the subject. The photography and narration are well done.

Today and Tomorrow: 16 mm., color, sound, showing time 5 minutes. Sponsored by The Muscular Dystrophy Association, 177th Street, and Harlem River, New York 53. Produced by and procurable on loan from Films for Industry, 135 West 52nd Street, New York.

This is a fund-raising film which shows, in the surroundings of a public playground, children who are afflicted with progressive muscular dystrophy. Against this background and with normal children as playmates, the helplessness of these children is accentuated. Their lack of balance and muscular weaknesses are exhibited as they try to play in the manner of normal children. The disease of all the children shown is of the clinical pseudohypertrophic muscular dystrophic type, in various stages of this most prevalent and progressive form.

The film contains a strong emotional appeal which well accomplishes the purpose of arousing the interest of the general public in sufferers of this disease, but it is lacking in specific information as to where these interests can be directed. It would be of interest mainly to lay audiences. The photography and sound are good.

MEDICAL LITERATURE ABSTRACTS

AMERICAN

A.M.A. Arch. Indust. Hyg. & Occupat. Med., Chicago

3:227-338 (March) 1951

Effects of Noise on Human Behavior and Communication. H. Davis. —p. 227.
Noise in Industry: Report of Conference Held During Tenth Annual Congress on Industrial Health of American Medical Association, in New York, Feb. 20, 1950. J. H. Sterner and S. R. Guild.—p. 232.
Physical, Medical and Rehabilitation Therapy of Hand Injuries. H. J. Flax.—p. 236.
Occurrence of DDT in Human Fat and Milk. E. P. Laug, F. M. Kunze and C. S. Prickett.—p. 245.
Hydrogen Sulfide Poisoning in Shale Oil Industry. G. Ahlborg.—p. 247.
*Treatment of Lead Poisoning with Sodium Citrate: Report of Four Cases. H. L. Hardy, R. C. Bishop and C. C. Maloof.—p. 267.
Pilot Program for Cancer Detection in Industry. B. N. Berg.—p. 279.
Toxic Effects of Exposure to Vapors of Aliphatic Amines. H. Brieger and W. A. Hodes.—p. 287.
Compensation Aspects of Myocardial Infarction in Industrial Medicine. J. H. Thompson.—p. 292.
Report on Industrial Hygiene in Western Zone of Germany. I. R. Tabershaw.—p. 298.

Sodium Citrate in Lead Poisoning.—Four patients were treated for lead poisoning with sodium citrate as the main component of therapy. Lead poisoning was acute in three patients and chronic in one. Doses of 4 gm. of sodium citrate four times daily by mouth for one week to one month were adequate for control of the symptoms. Studies of the lead excreted in the urine in these four cases did not warrant the conclusion that sodium citrate increases lead excretion. Increased coproporphyrinuria was observed during the acute illness in all four of the patients and well before the acute episode in at least two of them. In all patients the urinary lead and coproporphyrin values showed relatively good correlation. In all patients the sign of coproporphyrinuria was seen much earlier than the stippling of red blood cells. The mechanism of the coproporphyrinuria of plumbism is not definitely known.

A.M.A. Arch. Neurology and Psychiatry, Chicago

65:265-412 (March) 1951

*Third Ventriculostomy in Treatment of Obstructive Hydrocephalus in Children. H. C. Voris.—p. 265.
EEG and Cortical Electrograms in Patients with Temporal Lobe Seizures. H. Jasper, B. Pertuisset and H. Flanigin.—p. 272.
Permanency of Glutamic Acid Treatment. F. T. Zimmerman and B. B. Burgemeister.—p. 291.
Syndrome of Crocodile Tears. J. Chorobski.—p. 299.
Pain Below Level of Injury of Spinal Cord. L. J. Pollock, M. Brown, B. Boshes and others.—p. 319.
Prognosis in Topectomies and Lobotomies Relative to Body Type. N. S. Kline and A. M. Tenney.—p. 323.
Studies on Iron Content of Cerebrospinal Fluid in Different Psychotic Conditions. H. E. Lehmann and V. A. Kral.—p. 326.
Palmomental Reflex: Physiological and Clinical Analysis. J. R. Blake Jr. and E. C. Kunkle.—p. 337.
*Occlusion of Internal Carotid Artery. M. Fisher.—p. 346.
Intramedullary Tumors of Spinal Cord and Gliomas of Intradural Portion of Filum Terminale: Fate of Patients Who Have These Tumors. H. W. Woltman, J. W. Kernohan, A. W. Adson and W. M. Craig.—p. 378.

Obstructive Hydrocephalus in Children.—Hydrocephalus due to an obstruction in the ventricles or subarachnoid spaces is commoner in the infant than is generally supposed. A frequent cause of obstruction in infantile hydrocephalus is the Arnold-Chiari malformation, associated with spina bifida in many patients, especially those with myelocele. Suboccipital exploration was carried out in a number of these cases, without lasting relief of symptoms. Third ventriculostomy, i. e., establishment of a free communication between the third ventricle and the peduncular cisterns was then tried. The transfrontal approach was satisfactory in older children, but did not work out well in infants. Therefore a trial of the lateral or temporal approach was made. This has proved satisfactory in 10 patients with obstructive hydrocephalus associated with spina bifida and presumably due to the Arnold-Chiari syndrome. The patients were followed from six months to four years, and the results were excellent, with cessation of abnormal enlargement of the head and absence of increased intracranial pressure. Ventriculostomy by the lateral or temporal approach should be reserved for patients in whom the cause of the obstruction cannot be readily treated by direct surgical attack and in whom there is no evidence of obstruction of the basilar subarachnoid cisterns. According to the author, it is the procedure of choice for infants with obstructive hydrocephalus due to the Arnold-Chiari malformation.

Occlusion of Internal Carotid Artery.—Eight cases of occlusion of the internal carotid artery in men between the ages of 49 and 68 were studied, four of which were verified by postmortem examination. In two cases arteriographic or surgical confirmation of the diagnosis was made, while in the remaining two cases the diagnosis was made clinically. All the patients were seen on the wards of two general hospitals within a period of six months. Occlusion of the internal carotid artery is much commoner than has heretofore been believed. The clinical picture is highly characteristic, although variable. The basic feature is hemiplegia of rather severe degree, preceded by premonitory paralysis, paresthesia, blindness, dizziness, aphasia, or unconsciousness. Necropsy in the author's cases revealed that the occlusion of the internal carotid artery is usually in the region of the sinus and that the basic pathological process is atherosclerosis. Changes in the brain tend to be localized in the territory of the middle and anterior cerebral arteries, and the extent of the brain lesion may be explained partly by the anatomic pattern of the circle of Willis and partly by other, unknown, factors. Fleeting neurological symptoms, previously attributed to vasospasm, now have a pathological substratum that will serve for their further study. Intermittent, migraine-like headache was frequently observed alternating with the fleeting symptoms. It was steady, never throbbing, and was situated above the ipsilateral eye. Headache usually ceased after the onset of hemiplegia. Hemiplegia of unknown cause in younger persons is often due to disease of the internal carotid artery. The absence of carotid pulsation in the neck during the acute phase of hemiplegia may be diagnostic. Postoperative hemiplegia, as well as stroke following vascular collapse, is often due to thrombosis of the internal carotid artery distal to extreme atherosclerotic narrowing in the region of the carotid sinus. Unexplained cerebral embolism may arise from thrombotic material lying in the carotid sinus.

Alabama State Medical Assn. Journal, Montgomery

20:277-308 (Feb.) 1951

Treatment of Pyogenic Dermatoses. R. O. Noojin.—p. 277.
Psychosomatic Illness. J. W. MacQueen and F. A. Kay.—p. 283.
Dosage of Drugs—Infancy and Childhood. R. E. Cloud.—p. 287.
Kaposi's Varicelliform Eruption: Report of Fatal Case. W. H. Blank. —p. 289.

20:309-344 (March) 1951

Clinical Effects of ACTH and Cortisone in Certain Diseases. H. L. Holley.—p. 311.
ACTH and Cortisone in Blood Disorders and Related Neoplastic Diseases. W. H. Riser Jr.—p. 317.
Physiologic Effects, Contraindications, Dosage, and Control of ACTH and Cortisone Therapy. J. B. McLester.—p. 319.

The Association library lends periodicals to members of the Association and to individual subscribers in Continental United States and Canada for a period of five days. Three journals may be borrowed at a time. Periodicals are available from 1940 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied with stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted.

American J. Digestive Diseases, Fort Wayne, Ind.

18:43-76 (Feb.) 1951

Physiological Study of Two Proteases of Gastric Juice. M. J. Demole and G. Milhaud.—p. 43.
*Are Achlorhydria, Achylia Gastrica and Pernicious Anemia Precancerous Conditions? F. S. Weinberg.—p. 45.
Complications of Chronic Ulcerative Colitis. M. L. Brown, A. M. Kasich and B. Weingarten.—p. 52.
*Appraisal of Psychological Relationship of Coronary Disease to Peptic Ulcer. M. Feldman and S. Morrison.—p. 55.
Immediate Ambulation. A. J. Cantor.—p. 56.
Successful Ointment Therapy for Pruritus Ani. L. G. Bodkin and E. A. Ferguson Jr.—p. 59.
Chronic Peptic Duodenal Ulcer with Cancerous Transformation. E. F. Geever, V. L. Bolton and N. W. Fawcett.—p. 61.
Case of Acute Cholangitis (Post-Operative) Due to Proteus Vulgaris Sepsis Treated with Aureomycin. A. A. Goldbloom and M. Golbey. —p. 63.
Incomplete Obstruction of Small Intestine. A. Strelinger.—p. 66.
Demonstration of Tumor Involving Pancreas Through Use of Duodenal Drainage and Intravenous Injection of Secretin. N. R. Bothereau, F. H. Draper and G. E. Gibbs.—p. 70.

Pernicious Anemia and Cancer.—Since the introduction of liver therapy for pernicious anemia there have been reports commenting on the concurrence of pernicious anemia and cancer of the stomach. Authors who favor the idea that there is a connection between the two conditions consider chronic atrophic gastritis a common link. But Weinberg says that this link does not exist. In pernicious anemia there is achylia gastrica, which has nothing in common with achlorhydria but lack of hydrochloric acid. Achylia gastrica is a clinical entity with absolute lack of gastric secretion and disturbance of chymification and motility. The pathological changes are different as well: In achylia gastrica there is no gastritis; in achlorhydria, as it is found in cancer of the stomach, there is pangastritis. Weinberg stresses that achylia gastrica and pernicious anemia have no connection with cancer of the stomach and that they cannot be considered precancerous conditions. It has never been proved whether chronic atrophic gastritis, which leads to achlorhydria, is primary or secondary to gastric cancer. It has been shown, however, that over 80% of all persons in the cancer age have the same gastritic changes as have been found in stomach cancer; these changes are the "physiologic gastritis of old age" and cannot, therefore, be the basis for the development of malignancy. If we eliminate gastritis as a cause, how can we explain the increase in frequency of cancer of the stomach in the course of pernicious anemia found in some statistics? Two explanations have been considered: (1) the prolongation of life in pernicious anemia due to liver therapy and (2) a carcinogenic agent in the liver. The age increase does not seem to be of importance, because both diseases start at about the same age, and the prolongation of life is not sufficiently extensive to be significant. That the development of gastric cancer may be due to a carcinogenic agent in the liver can be demonstrated only by the avoidance of liver preparations and the substitution of stomach preparations that contain the intrinsic factor.

Relationship of Coronary Disease and Peptic Ulcer.—To investigate the correlation between peptic ulcer and coronary occlusion the authors made a survey of 1,522 autopsies. Peptic ulcer was detected in 101 patients (6.6%). The incidence of peptic ulcer was 9% among the 753 patients with arteriosclerosis of the coronary arteries and 10.5% in the 152 patients with coronary occlusion. While this shows a somewhat higher incidence of peptic ulcer in patients with coronary disease, other investigators have found in autopsy studies that peptic ulcer occurred with equal frequency in patients without coronary disease. In the second part of this report the authors give attention to clinical factors common to both diseases. Heightened excitability of the vagus is the common denominator. The diseases are similar in that they occur in nervous, unstable persons, have three basic phenomena (hypersensitivity, hyperirritability, and hyperactivity), occur more commonly among the more intelligent and educated people, have periodicity of symptoms, and similar personality changes. The two conditions generally originate at different age periods, but this may be due to blood vessel changes and to the difference in susceptibility of certain organs at certain ages. The aggravating effects in both are not too dissimilar, and both occur predominantly in males who live and work under stress. In the background of the development of peptic ulcer there are frequently endocrinologic and nervous factors associated with the transition from adolescence to manhood, whereas in coronary disease there is the transition from middle age to presenility. In other words, there may possibly be a similarly acting organic change, vascular in origin, endocrinologically and neurogenically initiated.

American Journal of Medicine, New York

10:131-274 (Feb.) 1951

*Effect of Adrenocorticotropic Hormone (ACTH) on Beryllium Granulomatosis and Silicosis. B. J. Kennedy, J. A. P. Pare, K. K. Pump and others.—p. 134.
Effects of Cortisone and ACTH in Cases of Chronic Pulmonary Disease with Impairment of Alveolar-Capillary Diffusion. J. R. West, J. H. McClement, D. Carroll and others.—p. 156.
Effect of ACTH in Chronic Lung Disease: Study of Five Patients. M. Galdston, S. Weisenfeld, B. Benjamin and M. B. Rosenbluth.—p. 166.
Expectoration of Abnormal Substances and Particles Including Parasites: Their Diagnostic Significance. A. G. Cohen.—p. 182.

ACTH in Beryllium Granulomatosis and Silicosis.—The lesions of beryllium granulomatosis consist of multiple granulomas, increased fibrosis in the interalveolar septa and in the granulomas, and dense collagen deposits. A cellular reaction, predominantly of lymphocytes and mononuclear cells, may be found in the interalveolar walls, between focal lesions, and at the periphery of the nodular granulomas. Pituitary adrenocorticotropic hormone (ACTH) was administered to two patients with chronic beryllium granulomatosis, because this hormone as well as cortisone produces alterations in cellular and fibrous tissue reactions. A striking improvement occurred in both, as evidenced by the clinical response and improvement in x-ray and respiratory function studies. A third patient, similarly treated by others, also improved. Improvement was demonstrated in one patient with silicosis after administration of adrenocorticotropic hormone. The period of observation is too short to permit conclusions as to how long the improvement will persist after cessation of therapy. The appearance of the chest x-rays was unaltered by treatment. Since there has been no adequate treatment for silicosis, further investigation of the effect of adrenocorticotropic hormone seems indicated.

American Journal of Psychiatry, New York

107:561-640 (Feb.) 1951. **Partial Index**

Displacement and Migration: Study in Social Psychiatry. L. Tyhurst. —p. 561.
Uses of Thematic Apperception Test. H. A. Murray.—p. 577.
Predictive Value of Brief Psychiatric Interview. C. L. Wittson and W. A. Hunt.—p. 582.
Narcoanalysis and Truth. F. C. Redlich, L. J. Ravitz Jr. and G. H. Dession.—p. 586.
*The Crime of Menticide. J. A. M. Meerloo.—p. 594.
Volunteer Worker and Psychiatric Hospital. A. H. Fechner and J. H. Parke.—p. 602.
Experimentally Produced Psychoses. P. H. Hoch.—p. 607.
Study of Dreams in Schizophrenia and Allied States. D. Noble.—p. 612.
Ego Development and Psychoanalytic Technique. R. M. Loewenstein. —p. 617.
Establishment and Function of Industrial Mental Hygiene Service. O. B. McAtee.—p. 623.

The Crime of Menticide.—The following questions have recently been raised: Is it possible through modern methods to change man's mind in behalf of certain ideological systems, to steal his spiritual freedom, or to compel him to cooperate with tyrannical political systems? Many psychiatric and psychoanalytic problems are touched on by these questions, such as the mishandling or criminal use of transference, mass hypnosis, the dangerous, intelligent madman, the technique of changing personalities (lobotomy, narcohypnosis, and truth serum), artificially provoked regressions with narcotics, and mass intoxication through terror and panic. Political evils force psychiatrists to become more aware of what they are doing, because their activities might be taken over in the service of devious political aims. An organized system of psychological intervention and judicial perversion, in which a powerful tyrant synthetically injects his own thoughts and words into the minds and mouths of the victims he plans to destroy by mock trial, may well be called menticide. The author cites examples of menticide, discusses the techniques it employs, and indicates ways of protection against it.

American Journal of Public Health, New York

41:263-373 (March) 1951. **Partial Index**

Epidemiological Approaches to Heart Disease: The Framingham Study. T. R. Dawber, G. F. Meadors and F. E. Moore Jr.—p. 279.
Effective Use of Penicillin to Reduce Contamination in Sputum Concentrates to Be Examined for Tubercle Bacilli. J. N. Abbott.—p. 287.
Interpretation of Results Obtained from Cultivation of Sputum Samples for M. Tuberculosis. E. M. Medlar, S. Bernstein and F. C. Reeves. —p. 292.
Use of Child Health Conferences for Training of House Officers and Medical Students: Survey of 238 Health Departments in 33 States. P. Harper and S. M. Wishik.—p. 312.
Joint Housing of Hospitals, Health Departments, and Laboratories: Survey of Joint Housing. M. Terris.—p. 319.
Id.: Hospital Administrator's Viewpoint. E. D. Barnett.—p. 326.
Id.: Health Officer's Viewpoint. W. A. Harris.—p. 331.

Am. Practitioner & Digest of Treatment, Philadelphia

2:113-216 (Feb.) 1951

Metabolic Bone Diseases in Practice: Osteoporosis, Paget's Disease, von Recklinghausen's Disease, and Albright's Syndrome. G. S. Gordan. —p. 113.
Neurocirculatory Asthenia: Diagnosis and Treatment. N. E. Reich. —p. 120.
Observations on Etiology and Treatment of Auricular Flutter: Analysis of 50 Cases. E. Goldberger and A. Baer.—p. 124.
Mechanism of Systolic Murmur in Anemia. E. Shapiro.—p. 128.
Orthopedic Management of Chronic Arthritis: Knee and Foot. J. G. Kuhns.—p. 134.
General Practitioners and Psychiatry. N. Brunori.—p. 138.
*Diagnosis and Treatment of Gout: Effects of Pituitary Adrenocorticotropic Hormone (ACTH) in Acute Attack. F. Kauflmann.—p. 146.
Medical Plans for Civil Defense and Disaster with Particular Attention to Local Planning With or Without National Plans. W. L. Wilson. —p. 151.
Headache Clinics: II. Migraine Headache. L. S. Blumenthal and M. Fuchs.—p. 163.
Comparative Study of Sodium-Free Salt Substitutes. A. B. Rimmerman and A. Halpern.—p. 168.
Importance of Cardiovascular Diseases in Modern Medicine. E. Baráth. —p. 172.

Diagnosis and Treatment of Gout.—The diagnosis of the early stage of gout is simple; recurrent attacks of acute joint pain with completely asymptomatic intervals, an increase in serum urate, and, eventually, the observation of urate tophi will lead the way to the correct diagnosis, which may be established by the therapeutic test with colchicine. This drug will in most of the cases relieve an acute attack of gouty arthritis, whereas other arthritides are not affected by it. The differential diagnosis of the late stage of gout is sometimes difficult but may be made with the aid of the history of sudden onset of acute attacks, elevated uric acid serum level and the observation of tophi. In the treatment of the acute episode of gout, one tablet (0.5 mg.) of colchicine should be given every hour, or two tablets every two hours, as soon as possible after the beginning of acute symptoms; the drug should be discontinued at the onset of nausea, vomiting, or diarrhea, which usually appear after 10 to 15 doses have been taken. A second course of colchicine after an interval of 48 hours may be required if the first one was not started promptly after the beginning of symptoms. Severe recurrent attacks of acute gouty arthritis may not be relieved, even by repeated massive doses of colchicine, and pituitary adrenocorticotropic hormone (ACTH) offers much promise in cases of this type. Dramatic relief, with subsidence of the acute symptoms within 12 hours, was obtained with a single injection of 80 mg. of pituitary adrenocorticotropic hormone in two men aged 62 and 56 with acute gouty arthritis not relieved by colchicine. A third patient, with a history of long-standing gout, showed little response to a daily dose of 80 mg. of pituitary adrenocorticotropic hormone for four days, but was later relieved by colchicine. In the light of Selye's adaptation theory, any decrease in the adrenocortical activity in a predisposed, gouty patient may precipitate an acute attack. By prompt stimulation of the adrenal cortices with following rebound phenomenon of decreased hormonal activity, such an attack may be elicited after various nonspecific stresses, after cessation of pituitary adrenocorticotropic hormone therapy in the acute episode, or in the interval or chronic stage of the disease. On the other hand, an acute gouty episode can be promptly terminated by pituitary adrenocorticotropic hormone injection in most of the cases, probably because of an increase in adrenocortical secretion in persons with such a deficiency. In this way the disturbing dual action of pituitary adrenocorticotropic hormone in eliciting and terminating an acute attack of gout can be explained.

Annals of Surgery, Philadelphia

133:145-288 (Feb.) 1951. **Partial Index**

*Effects on Human Subjects of Intravenous Fat Emulsions of High Caloric Potency. B. G. P. Shafiroff and J. H. Mulholland.—p. 145.
*Revascularization of Heart by Vein Graft from Aorta to Coronary Sinus. F. F. McAllister, D. Leighninger and C. S. Beck.—p. 153.
Carcinoma of Rectum: Study of Factors Influencing Survival Following Combined Abdominoperineal Resection of Rectum. E. J. Dunning, T. E. Jones and J. B. Hazard.—p. 166.
Nonoperative Treatment of Retained Postoperative Common Duct Stones. J. H. Strickler, J. J. Muller, C. O. Rice and I. D. Baronofsky.—p. 174.
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Observations on Growth of Aortic Anastomoses in Puppies. E. S. Hurwitt and S. A. Brahms.—p. 200.
Therapeutic Effect of Aureomycin in Experimental Peritonitis in Dog: I. Oral Therapy. F. B. Schweinburg, A. M. Rutenburg, S. Milrod and others.—p. 208.
Vagus Section in Treatment of Gastrojejunal Ulcer. G. Knox and J. P. West.—p. 216.
Cystogastrostomy: Treatment of Pancreatic Pseudocysts. F. H. Brandenburg, S. Maddock and R. J. Schweitzer.—p. 219.
*Death Following Stellate Ganglion Block. I. M. Pallin and E. V. Deutsch.—p. 226.
Reflux of Intestinal Chyle in Lymphatics of Leg. Servelle and Deysson. —p. 234.
Postoperative Traumatic Anal Incontinence: Technic of Repair. S. Leider and H. Peskin.—p. 240.
Prolapse of Rectum: Experiences with the Orr Operation in Two Cases. A. H. Levy and V. S. Johnson.—p. 244.
Suppurative Strumitis Caused by Salmonella Typhosa: Report of Case Cured by Surgery 24 Years After Acute Enteric Fever. A. G. Brenzier Jr.—p. 247.
Functioning Struma Ovarii: Report of Case. J. F. Fox and K. W. Clement.—p. 253.
Perineal Hernia: Report of Case with Many Associated Muscular and Fascial Defects. A. R. Koontz.—p. 255.
Liposarcoma of Extremity Associated with Multiple Subcutaneous Lipomas: Report of Two Cases Treated by Amputation. G. B. Starkloff, J. A. Saxton Jr. and R. E. Johnson.—p. 261.
Method of Hemipelvectomy with Abdominal Exploration and Temporary Ligation of Common Iliac Artery. J. H. Lazzari and F. J. Rack. —p. 267.
Contrast Visualization of Pulmonary Vessels as Aid in Early Diagnosis of Pulmonary Neoplasms: Case Report. R. A. Nabatoff.—p. 270.
Spontaneous Perforation of Common Bile Duct. D. E. Hart.—p. 280.
Squamous Cell Carcinoma of Rectum. J. P. O'Brien and D. J. Meehan. —p. 283.

Intravenous Administration of Fat Emulsions.—The development of a combined fat emulsion derived from the homogenization of coconut oil, gelatin, protein hydrolysate (amigen®), and dextrose solutions provided a new means of parenteral surgical nutrition. The practicability and the benefits of the fat emulsion were discussed in an earlier series of papers. In the present investigation the 10%, the 15%, and the 20% combined fat emulsions were infused intravenously in conjunction with 10% dextrose solution, so that the maximum caloric potential consistent with safe clinical therapy might be attained. The effect of single intravenous infusions of the combined fat emulsion in conjunction with dextrose solution was studied in a series of 19 subjects grouped according to the concentration of fat in the emulsion. The reaction rate averaged 16% for the three groups, with most of the reactions occurring in groups B and C, who received the 15 or 20% combined fat emulsion. Attention was given to systemic reactions, hematologic changes, urinary chemistry, and oxygen consumption. A second series of eight patients were studied from the standpoint of the effect of prolonged injections of the emulsion involving a minimal five day period of therapy. The incidence of reactions in this series was 19%. Clinical studies and pathological examinations showed that the emulsion was well tolerated and could be repeatedly infused for nutritional purposes.

Revascularization of Heart.—McAllister and associates present a progress report on the revascularization of the heart. The beneficial effect of arterialization of the coronary sinus had been demonstrated, but since it is impossible to employ the common carotid artery for the shunt in the human being and since there is no other satisfactory artery in the vicinity of the heart, they inserted a free vein graft between the side of the thoracic aorta

and the side of the coronary sinus. They found that the arterial inflow must be restricted by an aortic stoma measuring no more than 3.5 to 4 mm. in diameter. The coronary sinus should not be completely ligated as a preliminary, simultaneous, or subsequent secondary procedure. If it is, too much blood is introduced into the venous tree, so that the pressure approaches aortic levels and blood flow becomes greatly reduced. The excessive pressure causes cardiac failure or myocardial hemorrhage and scarring, and the reduced blood flow results in thrombosis of the grafts. If a vein graft is inserted between the aorta and the coronary sinus and if the sinus is left open so as to create an aortic right auricular fistula, the operation is well tolerated. Forty-seven consecutive patients have been operated on without mortality, and the grafts have remained open in 65% of the cases. This procedure, of itself, furnishes some protection to the heart against occlusion of a major coronary artery. If, at a second stage, the coronary sinus is partially occluded to 3 mm. diameter, there is neither further mortality nor thrombosis of the grafts. Moreover, this two stage procedure has protected 12 of 13 dog hearts against occlusion at the origin of the anterior descending branch of the left coronary artery.

Death Following Stellate Ganglion Block.—A 55 year old woman was given a series of six right stellate ganglion blocks on account of postoperative lymphedema of the arm. From 6 to 12 cc. of 1.5% piperocaine (metycaine®) hydrochloride was used for each block, for which the posterior approach was used. During the second block the patient complained of weakness and dizziness after injection, but when she was put in supine position she felt much better. After five blocks had been done the pain in the arm diminished. When the needle was inserted for the sixth block the patient cried out. Aspiration revealed neither blood nor spinal fluid. After 4 cc. of 1.5% piperocaine was injected, the patient again cried out. On withdrawal of the needle she felt dizzy. She was placed in a semireclining position, and her eyeballs rolled upward and to the right, and respirations and pulse could not be detected. As the result of various measures of resuscitation, the patient was kept alive for 39 hours but then died. The authors cite similar cases from the literature and attempt to relate the sudden cardiorespiratory cessation to vagal arrest of the heart and central respiratory center. They emphasize that the performance of stellate ganglion block requires a thorough understanding of the anatomy and the neurophysiology involved. It should not be considered as a simple procedure to be performed by the untrained.

Journal Clin. Endocrinology, Springfield, Ill.

11:1-118 (Jan.) 1951

*Treatment of Congenital Adrenal Hyperplasia with Cortisone. L. Wilkins, R. A. Lewis, R. Klein and others.—p. 1.

Studies of Urinary Corticosteroid by Method Permitting Analysis of Steroids Poorly Soluble in Water: II. Insufficient Adrenal Function. C. W. Lloyd and J. Lobotsky.—p. 26.

Effect of Adrenocorticotropic Hormone and Cortisone on Serum Hexosamine Level in Acute Disseminated Lupus Erythematosus. N. F. Boas and L. J. Soffer.—p. 39.

Effect of Adrenalin on Adrenal Cortical Function. E. L. Bliss, S. Rubin and T. Gilbert.—p. 46.

Neutral Steroids of Human Urine: Quantitative Studies in Various Clinical Conditions. S. L. Tompsett.—p. 61.

Studies on Hormonal Control of Serum Lipid Partition in Man. D. Adlersberg, L. E. Schaefer and S. R. Drachman.—p. 67.

Excretion of Acid Phosphatase as Measure of Prostatic Development During Pubescence. L. C. Clark Jr., E. Beck and H. Thompson.—p. 84.

Correlation Between Serum Protein-Bound Iodine and Radioiodine Conversion Ratio in Various Thyroid States. G. E. Sheline, M. C. Moore, A. Kappas and D. E. Clark.—p. 91.

Action of Estrogens on Release of Luteinizing Hormone in Menopausal Women. J. W. Funnell, C. Keaty and A. A. Hellbaum.—p. 98.

Glycogen-Estrogen Relationship in Vaginal Tract. W. B. Ayre.—p. 103.

Cortisone for Adrenal Hyperplasia.—Congenital adrenal hyperplasia causes pseudohermaphrodism in females and macrogenitosomia precox in males. After unsuccessful attempts to suppress the secretion of androgen in patients with congenital adrenal hyperplasia by the administration of steroids, which have a chemical structure similar to that of androgens but possess relatively little androgenic activity, Wilkins and co-workers began to treat these patients with cortisone. This paper presents the results of cortisone administration in six women and two men with congenital adrenal hyperplasia and includes the observations of other investigators in two additional cases. In these 10 cases initial doses of 50 to 100 mg. of cortisone daily in older children or 25 to 50 mg. daily in young infants caused rapid decrease of the urinary 17-ketosteroids. Later, the suppression of 17-ketosteroid excretion was maintained by 25 mg. of cortisone daily, or 50 mg. every other day in older children; doses varying from 10 to 25 mg. per day sufficed in the infants. The effects lasted as long as treatment was continued, the longest period being five to six months. No changes in carbohydrate metabolism were observed. There was an increase in urinary nitrogen excretion suggesting decrease of protein anabolism. In patients with congenital adrenal hyperplasia and defective electrolyte regulation, cortisone probably has some sodium-retaining activity. It is not now possible to decide whether desoxycorticosterone in addition to cortisone is required to maintain electrolyte equilibrium in some of these patients. In most cases the period of treatment has been too short to note definite decrease of virilization. There has been some decrease of acne and seborrhea in a number of cases. In two patients treated for five months, development of the breasts and estrogenic changes of the vaginal smear occurred, and one girl has had four regular menstrual periods. In one patient hypertension disappeared under treatment. In the patient showing Addisonian-like pigmentation, there was considerable fading. Treatment with cortisone in small doses offers the possibility of preventing or suppressing the progressive virilization which occurs with congenital adrenal hyperplasia and may permit the normal development of feminine characteristics in female pseudohermaphrodites.

Journal Lab. and Clinical Medicine, St. Louis

37:165-330 (Feb.) 1951

Studies of Hemagglutinins in Hereditary Spherocytosis and in Acquired Hemolytic Anemia: Their Relationship to Hypersplenic Mechanism. C. S. Wright, M. C. Dodd, B. A. Bouroncle and others.—p. 165.

*Anemia of Cancer Patients and Its Relation to Metastases to Bone Marrow. Shu Chu Shen and F. Homburger.—p. 182.

Blood Ergothioneine Levels in Disease. R. S. Fraser.—p. 199.

Effect of Various Protein Hydrolysates and Amino Acids on Uremic Rat. J. H. Lindberg and S. Freeman.—p. 207.

Fat Emulsion for Intravenous Nutrition in Rabbits. H. C. Meng.—p. 222.

Production of Insulin Sensitivity with Adrenocorticolytic Drug DDD (2,2-bis [Parachlorophenyl]-1,1-Dichloroethane). J. Nichols and L. I. Gardner.—p. 229.

Studies of Radiogallium as Diagnostic Agent in Bone Tumors. W. C. Mulry and H. C. Dudley.—p. 239.

Cryoglobulinemia: III. Influence of Cryoglobulin on Suspension Stability and Sedimentation Rate of Erythrocytes. E. H. Luckey, E. Russ and D. P. Barr.—p. 253.

Electrophoretic Characterization of Serum from Rheumatoid Arthritis Patients. A. F. Reid, R. M. Pike, S. E. Sulkin and H. C. Coggeshall.—p. 264.

Treatment of Dicumarol-Induced Hypoprothrombinemia in Man with Emulsified Vitamin K_1 Administered Intravenously. D. M. Watkin, T. B. Van Itallie, W. B. Logan and others.—p. 269.

Effect of Benemid on Plasma Penicillin Levels. J. F. Waldo and J. T. Tyson.—p. 272.

Clinical and Biologic Significance of Penicillin-Resistant Staphylococci, Including Observations with Streptomycin, Aureomycin, Chloramphenicol, and Terramycin. W. W. Spink.—p. 278.

Some Factors Concerned with Two-Stage Plasma Prothrombin Assay. C. L. Johnston Jr. and J. H. Ferguson.—p. 294.

Enzyme Studies on Human Blood: VIII. Effect of Fibrinogen Concentration on Thrombin Clotting Time. G. Y. Shinowara and L. Rosenfeld.—p. 303.

Id.: IX. Fibrinogen Content of Stored Plasma. L. Rosenfeld and G. Y. Shinowara.—p. 311.

Anemia in Cancer and Metastases to Bone Marrow.—It is usually assumed that anemia in cancer patients, excluding that due to blood loss or to hemolysis, is due to bone marrow invasion. However, this explanation is not in keeping with the observation that anemia is frequently encountered in cancer patients who have no skeletal changes and inversely anemia may be absent in the presence of extensive bone metastases. Shen and Homburger review morphologic studies of the peripheral blood and bone marrow made in 193 patients with advanced cancer. Of the 50 patients who had evidence of bone metastases 24 were anemic and 26 were not. In 16 anemic patients (eight with and eight without metastases to bone) cobaltous chloride, 60 to 240 mg. daily, was used in testing the bone marrows of these patients for response to such a hematopoietic stimulus. In all six patients with osseous metastases who received an adequate trial of the drug, the administration of cobalt was followed by reticulocyte responses. Of the four patients without

metastases to bone who could tolerate cobalt for an adequate period, three showed definite reticulocyte responses followed by increase in red cells, hemoglobin, and hematocrit. The other patient showed no hematologic response. Cobalt therapy in cancer patients with anemia may increase erythropoiesis regardless of metastasis to bone, but it fails to produce subjective improvement and may cause symptoms referable to the gastrointestinal tract or suggestive of angina pectoris. It is concluded that anemia associated with cancer is not usually due to bone marrow replacement by neoplastic tissue.

Journal of Nervous and Mental Disease, New York

113:95-188 (Feb.) 1951

Excessive Hunger as Symptom of Cerebral Origin. W. R. Kirschbaum. —p. 95.
Tuberculosis in Mental Hospitals. J. D. Wassersug and W. F. McLaughlin.—p. 115.
Electrocardiogram in Psychiatric Patients (Including Report of Electrocardiogram Following Frontal Lobotomy). J. E. Oltman and S. Friedman.—p. 127.
Relationship of Vegetative Nervous System to Uremia. L. Hess.—p. 136.
Pseudo-Diphtheritic Polyneuritis. J. A. Di Fiore.—p. 144.
Mood, Anger and Somatic Dysfunction. I. D. Harris.—p. 152.
Comparison of Insulin Coma Therapy and Electronarcosis in Schizophrenia. S. Reznick and V. Arnett.—p. 159.
Tuberculous Otitis and Meningitis. D. I. Abruse and E. Levenson. —p. 165.
Epilepsy and Arteriosclerosis. A. Gordon.—p. 170.

Journal of Nutrition, Philadelphia

43:193-344 (Feb.) 1951. **Partial Index**

Histologic Bioassay of 3-Methyl-*l*-Ascorbic Acid. H. M. Goldman and B. S. Gould.—p. 123.
Duodenal Ulcers, Liver Damage, Anemia and Edema of Chronic Choline Deficiency in Dogs. A. E. Schaefer, D. H. Copeland and W. D. Salmon.—p. 201.
Evaluation by Dog Growth of Egg Yolk Protein and Six Other Partially Purified Proteins, Some After Heat Treatment. D. M. Mabee and A. F. Morgan.—p. 261.
Effect of Pyridoxine Deficiency on Reproduction in Rat. M. M. Nelson and H. M. Evans.—p. 281.
Experimental Dental Caries in Rats. F. J. McClure.—p. 303.
Folic Acid and Vitamin B_{12} Content of Milk of Various Species. R. A. Collins, A. E. Harper, M. Schreiber and C. A. Elvehjem.—p. 313.
Sequelae to Administration of Vitamin B_{12} to Humans. B. F. Chow. —p. 323.

Journal of Pediatrics, St. Louis

38:147-274 (Feb.) 1951

Occurrence of Lysozyme in Cerebrospinal Fluid and Serum of Infants and Children. E. F. Rabe and E. C. Curnen.—p. 147.
Feeding of Premature Infants: Value of High Caloric Diets in Reducing Length of Hospital Stay. J. B. Hardy and E. O. Goldstein.—p. 154.
*Treatment of Hyperthyroidism with Radioactive Iodine. G. B. Forbes and A. M. Perley.—p. 158.
Some Observations on the Use of Adrenocorticotropic Hormone in Atopic Dermatitis in Infancy. A. DiGeorge and W. E. Nelson.—p. 164.
Study of Prophylactic Value of Chloroquine in Children. H. A. Poindexter.—p. 169.
*Auricular Septal Defects in Children. J. D. Keith and C. C. Forsyth. —p. 172.
Traumatic Periostitis in Young Children. G. H. Barmeyer, L. R. Alderson and W. B. Cox.—p. 184.
Major Hereditary Ectodermal Dysplasia. R. J. Ellingson.—p. 191.
Situs Inversus: Report of Three Cases and Review of Literature. N. Tanner-Cain and E. P. Crump.—p. 199.
Current Adoption Practices. C. S. Amatruda and J. V. Baldwin.—p. 208.
Experiences with Elective Rooming-in Program. M. M. Pennoyer. —p. 213.
The Astoria Plan: A Decade of Progress. H. Jacobziner.—p. 221.

Hyperthyroidism and Radioactive Iodine.—A Negro girl aged 11 with diffuse toxic goiter and rheumatic heart disease was treated with radioactive iodine. This method of treatment seemed justified since the patient had failed to respond in a satisfactory manner to strong iodine (Lugol's) solution; she had failed to cooperate to the degree necessary to insure success with propylthiouracil, and the risks of surgical treatment by thyroidectomy were increased by the presence of rheumatic heart disease. On admission to the hospital, the patient's temperature was 100.2 F., pulse rate 120, respirations 24, and blood pressure 160/74. The basal metabolic rate ranged from + 45 to + 58%. After it was ascertained by means of a tracer dose of I^{131} that the thyroid would collect radioiodine in a sufficient quantity to suggest a successful radiation effect, a therapeutic dose of radioiodine, i. e., 5 mc., carrier-free, was administered by mouth in a single dose. Except for a gain in weight, there was little change in the patient's clinical course for the first four weeks. The basal metabolic rate dropped abruptly in the fifth week to + 15 and + 23%, in serial determinations, and the pulse fell to an average value of 100. During the sixth week, a decrease in restlessness, exophthalmos, and in tremor of the extremities was noted and the blood pressure fell to 135/85. Mild leukopenia and anemia without thrombopenia occurred during the second week, but the blood cell count then rose rapidly, with the red blood cell count 5,900,000 and the white blood cell count 7,400 at the time of discharge from the hospital five weeks after therapy. Three months after therapy, the patient exhibited no symptoms or signs of thyrotoxicosis other than the mild hypertension and slight exophthalmos. The blood pressure was restored to normal six months after therapy and has remained normal to date. The size of the thyroid gland decreased until it measured approximately 3 by 4 cm., and it has remained that size. Because of the reduction in the basal metabolic rate to subnormal values (lowest reading —35%), the patient was given 0.03 gm. of thyroid hormone by mouth, daily for six months. The patient's clinical course was entirely satisfactory. She returned to school and has been able to engage in normal physical activity. Menarche occurred at the age of 12 years, 2 mo. Menstruation has been regular since. Radioiodine uptake curves of the thyroid gland obtained at the time of treatment and again 21 mo. later are presented. Radioactive iodine should not be the treatment of choice in juvenile hyperthyroidism, but it may be useful in certain selected patients.

Auricular Septal Defects.—Fourteen children, 11 girls and three boys, with evidence of atrial septal defect confirmed by cardiac catheterization are reported on. Three-quarters of the patients were thin, but the other quarter was of an average physique without obesity. A review of the clinical observations in these patients suggests that there is a common pattern that will frequently permit a presumptive diagnosis on physical examination alone. The typical patient is a somewhat thin girl aged 7 whose heartbeat has increased in force and who has a systolic murmur of moderate intensity in the first to third left interspaces. The murmur is not accompanied by a thrill, but is usually associated with an accentuated second heart sound down the left border of the sternum. The electrocardiogram usually shows right axis deviation, and under the fluoroscope one sees a slight to moderately enlarged heart with increased and pulsating hilar shadows, and the pulmonary trunk is usually bulging. A close approximation of this pattern was observed in most of the author's 14 patients. Accurate diagnosis of auricular septal defects permits proper management of physical activity of the patient and choice of cardiac surgery to correct the defect. One female patient, aged 10, was operated on. Silk sutures were passed through the plane of the auricular septum. These were drawn taut and tied in an effort to close or eliminate the opening between the auricles. The patient had a satisfactory convalescence from the operation. There was moderate improvement in exercise tolerance following operation, which was sustained for six to eight months. A generalized decrease in the size of the right auricle was demonstrated on roentgenologic examination. The optimum surgical correction of an auricular septal defect will be difficult to achieve by present techniques, but results obtained in the case reported on suggest that the problem is not insuperable. Untreated patients with auricular septal defects survive approximately two-thirds of the normal life span.

Kansas Medical Society Journal, Topeka

52:45-92 (Feb.) 1951

Problem of Success and Failure in School Age Child. R. A. Moon. —p. 45.
Rapid Rehabilitation of Disabilities of Knee. D. L. Rose and L. G. Warner.—p. 49.
Use of Laboratory in Diagnosis of Liver Disease. T. J. Rankin.—p. 53.
Primary Tumors of Bladder: Survey of 275 Cases. J. W. Warren Jr. —p. 59.

FOREIGN

Annales Paediatrici, Basel

176:73-136 (Feb.) 1951. **Partial Index**

*Thirty-Six Years of Papaverine Therapy for Spasm of Pylorus in Newborn and Young Nursing Infants: Old and New Indications. E. Mayerhofer.—p. 73.
Toxic Gastroenteritis. E. Nassau.—p. 82.
Diencephalon Syndrome with Hypertonia in Encephalitis. L. Barta.—p. 93.
Contribution to Clinical Picture of Hemolytic Anemia. B. Lindquist and S. Widell.—p. 98.

Papaverine Treatment for Spasm of Pylorus in Infants.—Several hundred infants with spasm of the pylorus were treated with 0.01 gm. of papaverine hydrochloride daily by mouth during the period 1913-1949. Recovery occurred only in cases in which diagnosis was made early. Only a partial effect or no effect whatsoever may be obtained with this method of treatment in the presence of a hypertrophic tumor in the pyloric sphincter. This applies even more to cases of secondary stenosis of the pylorus in which the largest doses of papaverine hydrochloride proved ineffective and in which surgical treatment is indispensable. Spasm of the pylorus frequently occurs in the absence of hypertrophy of smooth muscle in the allergic syndrome of newborn infants. Early treatment of this allergic spasm provides effective prophylaxis against the later occurrence of hypertrophic stenosis of the pylorus, since in the absence of treatment the latter may develop from the primary functional spasm by increased muscular activity resulting in a tumor of the muscle with secondary stenosis. In addition, treatment of an allergic spasm of the pylorus with papaverine hydrochloride may effectively relieve serious disturbances of breast feeding and early nutritional disturbances of newborn babies. Combined administration of a daily dose of 0.01 gm. of papaverine hydrochloride with 0.05 gm. of aminopyrine in powder form by mouth is recommended before breast or bottle feeding. This dose may be repeated three to four times within 24 hours according to the age of the infant and the severity of the condition. Suppositories, drip enemas or injections of pure papaverine hydrochloride may be given if oral administration is impossible because of severe vomiting. In cases of simultaneous abdominal pain and diarrhea in newborn infants, combined treatment with codeine and aminopyrine is recommended, but papaverine hydrochloride remains the basic drug for antispasmodic therapy. The author stresses the importance of the neuropathic factor in pyloric stenosis of nursing infants.

Annals of Rheumatic Diseases, London

9:281-448 (Dec.) 1950

Gout: Unusual Case with Softening and Subluxation of First Cervical Vertebra and Splenomegaly: Result of ACTH Administration and Eventual Post-Mortem Findings. G. D. Kersley, L. Mandel and M. R. Jeffrey.—p. 282.
Methods of Treatment of Rheumatoid Arthritis and Ankylosing Spondylitis Depending on Stimulation of Pituitary-Adrenal Function (Other than Treatment with Cortisone and ACTH). F. Coste and F. Lacronique.—p. 305.
Study of Preparation of ACTH. F. Coste and F. Delbarre.—p. 317.
*Senile Ankylosing Hyperostosis of Spine. J. Forestier and J. Rotes-Querol.—p. 321.
Theory of Pathogenesis of Rheumatoid Arthritis. A. D. Wallis.—p. 331.
"Chronic Rheumatic" and His Pains: Psychosomatic Aspects of Chronic Non-Articular Rheumatism. P. Ellman and D. Shaw.—p. 341.
Oral and Intravenous Iron Therapy in Anaemia of Rheumatoid Arthritis. D. N. Ross.—p. 358.
Synovial Membrane: Some Observations in Normal and Arthritic Human Joints. K. Maunsell, F. Wrigley, T. C. Highton and L. B. Holt.—p. 363.
Rheumatoid Spondylitis: Paediatric Problem. M. Lucchesi and O. Lucchesi.—p. 372.
Agglutinating Factor for Sensitized Sheep Erythrocytes in Serum and Joint Fluid from Rheumatoid Arthritis Patients. N. Svartz and K. Schlossmann.—p. 377.

Senile Ankylosing Hyperostosis of Spine.—The clinical and radiological study of nine cases, combined with necropsy findings in two specimens, enabled Forestier and Rotes-Querol to set out some of the clinical, pathologic and radiological features of a specific condition among the ankylosing diseases of the spine. The condition is to be differentiated from ankylosing spondylitis, and the authors propose for it the term "senile ankylosing hyperostosis of the spine." This name emphasizes: (*a*) the hyperostosis, a most striking pathologic element, and (*b*) two constant clinical features: spinal rigidity and advanced age. It is not a rare disease, but most often either goes unnoticed or is mistaken for some other form of vertebral ossification. Because of the mild nature of the symptoms no active treatment is required. Roentgenologic examination reveals bony outgrowths or hyperostoses that arise from the anterolateral aspect of the vertebral bodies and grow upward in a "candle flame" formation over the lumbar disk spaces; at the level of the dorsal disks they are often thickened. They have a bony structure with a dense cortex similar to that of the head of the femur, the cancellous bone being in continuity with that of the vertebral bodies. They may coexist with osteophytes, but have entirely different anatomic features.

British Journal of Cancer, London

4:347-436 (Dec.) 1950. **Partial Index**

*Further Studies on Prognosis of Breast Carcinoma. H. J. G. Bloom.—p. 347.
Principles of Treatment by Radiotherapy in Breast Carcinoma. R. McWhirter.—p. 368.
Effect of Freezing and Freeze-Drying on Transplantation of Sarcoma 37. P. Warner and J. Gostling.—p. 380.
Carcinogenic Activity of Tannic Acid: Liver Tumours Induced in Rats by Prolonged Subcutaneous Administration of Tannic Acid Solutions. B. Korpássy and M. Mosonyi.—p. 411.
Experiments on Chemotherapy of Cancer: Screening Tests with Six Groups of Organic Compounds on Implanted Mouse Tumours. D. Hamer, I. W. Hughes, M. Stacey and others.—p. 421.

Prognosis of Breast Carcinoma.—In a recent investigation Bloom had stressed the significance of the histologic architecture of the tumor in cases of mammary carcinoma. A classification based on the microscopic appearance of the tumor (grade) combined with a knowledge of its extent (stage) was found to provide a more reliable guide to prognosis than could be achieved by either grading or staging alone. In the present report Bloom is concerned with some further aspects of prognosis of breast cancer. No significant differences in outcome were revealed in the various age groups, the younger women faring no worse than the older ones. The incidence of tumors of low and also of high malignancy in the various decades was practically the same. It is useless to try to assess the effect of the delay in seeking treatment without reference to the histologic type of growth involved. For example, delay is of little importance for patients with highly malignant (grade 3) tumors; it does not seem to matter whether such patients are treated early (less than six weeks) or late (six to 12 months), the prognosis is equally bad. On the other hand, the time factor appears to influence the outlook of women with growths whose behavior is essentially more benign (grade 1). In this type of case a loss of more than six months means a substantial fall in the survival rate. The site of the tumor in the breast was found to exert no striking effect on prognosis. It is possible, however, that the outlook for patients with growths of low grade malignancy may be influenced slightly by this feature. The size of the primary growth influences prognosis, particularly in the intermediate grade of tumors, but size was evidently of no prognostic importance in either low or high grade malignancy. Pregnancy following the adequate control of previous mammary carcinoma does not appear to influence the outlook adversely.

British Journal of Venereal Diseases, London

26:157-212 (Dec.) 1950. **Partial Index**

Complement-Fixation Technique: III. Wassermann Reaction. I. N. O. Price.—p. 172.
Treatment of Syphilis with Penicillin: Review of 123 Cases Treated in H. M. Forces. R. Lees and L. Watt.—p. 174.
Virus and Venereal Disease. S. P. Bedson.—p. 177.
Therapeutic Paradox from Penicillin Therapy in Laryngeal Syphilis: Report of Case. A. I. Suchett-Kaye.—p. 183.
Arsenical Encephalopathy Occurring in Treatment of Lues During Pregnancy. R. Lees and J. R. G. Buchanan.—p. 185.

An asterisk (*) before a title indicates that the article is abstracted. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

1:317-338 (Feb. 17) 1951

Some Typical Data from Cases of Pink Diseases. C. S. Hicks.—p. 317.
*Sulphonamides and Acute Tonsillitis: Controlled Experiment in Royal Air Force Community. T. C. MacDonald and I. H. Watson.—p. 323.
*"Sore Throat" in General Practice. J. B. Landsman, N. R. Grist, R. Black and others.—p. 326.
Lead-Poisoning in Children: Report of Five Cases, with Special Reference to Pica. N. F. E. Burrows, J. Rendle-Short and D. Hanna.—p. 329.
Keratoderma Palmaris et Plantaris Congenitalis. D. Macaulay.—p. 334.
False Diagnosis of Patency of Fallopian Tubes. M. M. White.—p. 336.

Sulfonamides and Tonsillitis.—A study was made of the effectiveness of sulfonamides in the treatment of 82 cases of acute tonsillitis. The cases were divided equally into treated and control groups. Fifty tablets (25 gm.) of sulfatriad (37.5% sulfadiazine, 37.5% sulfathiazole and 25% sulfamerazine) were given to each patient in the treated group; each patient in the control group received 50 lactose tablets. All the patients were treated by bed rest and given copious fluids. Analysis of clinical records revealed no difference between control and treated cases in regard to the speed of recovery from various symptoms (temperature, edema, exudate, adenitis and pain) regardless of the presence or absence of beta hemolytic streptococci. However, judged by their over-all clinical appearance, the treated patients seemed to recover more rapidly. The administration of sulfatriad had no effect on the survival of beta hemolytic streptococci in the cases examined. The authors conclude that the findings do not justify the routine use of a potentially dangerous drug such as sulfatriad in the treatment of acute tonsillitis. They feel that other methods can be found to improve the well-being of the patient if the difference of recovery is only a matter of hours.

"Sore Throat" in General Practice.—Landsman and his associates are concerned with the epidemiology and best method of treatment for "sore throat." Their study is based on 100 patients who complained of sore throat as the leading symptom. Throat cultures showed a normal flora in approximately one third of the patients; a heavy growth of beta hemolytic streptococci was evidenced in a similar proportion; a few colonies were seen in 22%, and a moderate growth of beta hemolytic streptococcus in 14% of the patients. Therefore, the authors state that less than half the cases (46%) can be regarded as streptococcal in origin. This observation is important since it is a common misapprehension that acute tonsillitis almost always implies a streptococcal origin. About one fourth of the streptococcal cases were not exudative. Twenty-six patients were given sulfanilamide (0.5 gm.); 26 were given 0.5 gm. of sulfatriad (37.5% sulfadiazine, 37.5% sulfathiazole and 25% sulfamerazine), and 43 were given lactose tablets. The results of the therapeutic trial did not support the thesis that sulfonamides exert a beneficial effect in the treatment of acute tonsillitis. Neither of the sulfonamide tablets was appreciably superior to the lactose tablet, which presumably was therapeutically inert. The average duration of fever and pain in those patients treated with lactose was exceedingly short, namely, 1.07 and 1.95 days respectively. The authors conclude that in the treatment of acute tonsillitis it is unnecessary as well as expensive to use drugs, such as the sulfonamides, that have definite and known dangers.

Chinese Medical Journal, Shanghai

68:327-402 (Nov.-Dec.) 1950. **Partial Index**

Pneumoperitoneum Combined with Streptomycin in Treatment of Pulmonary Tuberculosis: Preliminary Report of 40 Cases. Tung-Nien Sun.—p. 327.
Roentgenologic Examinations for Pulmonary Tuberculosis in Pregnancy: Incidence in 1,000 Consecutive Chinese Patients. Liu Chi-Hsiong.—p. 341.
*Pregnancy Test with Male Toad in Shanghai. S. P. Tien, M. P. Chen and Y. Hua.—p. 346.
Acute Hemolytic Anemia with Atypical Isohemagglutinins and Autohemagglutinins. Y. S. Chen, P. C. Hsueh and C. L. Chiu.—p. 357.
Wandering Spleen with Torsion of Pedicle. H. C. Lan, C. W. Yao and Y. L. Kwang.—p. 365.

Pregnancy Test with Male Toad.—Tien and co-workers began in March 1949 to use male toads for pregnancy tests. The toads were captured in the fields and vegetable gardens in the region of Shanghai and might be classified as Bufo bufo asiaticus Steindachner. The test was made with 5 cc. of untreated morning urine. A total of 1,060 pregnancy tests was made. The accuracy was 97.8% in 333 tests on 306 healthy pregnant women. The accuracy rate was only 89.73% in 877 tests on women with various types of pathologic conditions associated with pregnancy, such as abortion, ectopic pregnancy, hydatidiform mole and choriocarcinoma. Detachment of the placenta from its site of implantation in most cases of tubal abortion and rupture, and the degeneration of placenta tissue in cases of old ectopic gestation, and technical errors and insensitivity of the test animals explained some of the erroneous results. No false positive test was found among 248 tests made in various gynecological conditions unassociated with pregnancy. Thirty international units of chorionic gonadotropin was found to be the minimal dose necessary to produce a positive reaction in the average male toad in the spring. The accuracy rate was 60.6% in 99 cases of ectopic pregnancy. The test might serve as a diagnostic aid in ectopic pregnancy when results are positive; however, a negative result could not rule out the possibility of ectopic pregnancy. The urine in five cases of choriocarcinoma did not have a higher concentration of chorionic gonadotropin than in cases of hydatidiform mole by quantitative determination. Results of the pregnancy test became negative after the evacuation of the products of conception much sooner in normal pregnancy, abortion and ectopic gestation than in cases of hydatidiform mole. In the former group, results of the test might remain positive to the third day after evacuation, while in the latter results usually remained positive until the ninth day.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

95:169-264 (Jan. 20) 1951. **Partial Index**

Rare Cutaneous Lesion (Angiokeratoma Corporis Diffusum) as Symptom of a Hitherto Unknown Disturbance in Phosphatide Metabolism (Thesaurismosis). M. Ruiter.—p. 184.
*Occupational Paralysis of Ulnar Nerve. J. G. Y. de Jong and J. G. Geerling.—p. 192.
*Significance of Price-Jones Curve in Hemolytic Disease of the Newborn. S. I. de Vries.—p. 201.

Occupational Paralysis of Ulnar Nerve.—In a radio tube factory, paralysis of the ulnar nerve developed in eight inspectors. The fact that these workers leaned both elbows against a hard table is regarded as largely responsible for this paralysis. However, other contributing factors were searched for. A thorough neurologic examination was combined with inquiry into the diet, the misuse of alcohol or tobacco and a possible hereditary predisposition to neuritis. The scalenus syndrome was searched for; the musculature was tested electrically, and the cervical vertebrae were examined by roentgenoscopy for detection of possible cervical ribs. The lungs and the lumbosacral vertebrae were also examined roentgenologically. The histories of the eight patients are given. Treatment consisted largely of galvanotherapy and administration of vitamins. This treatment effected improvement, but in some cases mild hypesthesia remained. Rubber sponge pads were placed under the elbows of the radio tube inspectors to prevent this injury to the ulnar nerve. This measure proved effective.

The Price-Jones Curve in Hemolytic Disease of the Newborn.—The hematologic disorders that develop in newborn infants as the result of Rhesus-factor antagonism in the parents may appear not only in the form of icterus gravis, congenital anemia and fetal hydrops but also in milder forms, which may not be recognized clinically. De Vries has demonstrated changes in the Price-Jones curve of the erythrocytes in newborn infants with hemolytic disease. He made studies on 60 newborn infants with hemolytic disease, belonging to six different groups of 10 infants each. The first four groups were Rh-positive infants born at term to (1) an Rh-positive mother, (2) an Rh-negative primipara, (3) an Rh-negative multipara and (4) an Rh-negative primipara or multipara. The infants of group 4 differed from those in groups 2 and 3 in that their reaction to the Coombs test was positive, whereas results were negative in groups 2 and 3. The infants in groups 5 and 6 were prematurely born Rh-positive children, those of group 5 having an Rh-positive, those of group 6 an Rh-negative mother. The author found that qualitative changes in the Price-Jones curve were of greater significance than the abso-

lute size of the erythrocyte diameter, the dispersion or the coefficient of variability. These changes did not always correspond with the serological findings in the mild forms of the disease. Moreover, the titer of the partial agglutinins during the last months of pregnancy did not always correspond with the severity of the anemia or with the erythroblastosis in the blood of the newborn, and the outcome of the Coombs test was not always as might be expected. This is considered as support for the opinion that hematological anomalies are sometimes more subtle indications than the serological ones.

Praxis, Bern

40:131-150 (Feb. 15) 1951

Nature and Significance of Hormones. A. Schüpbach.—p. 131.
*Calcium Salt of Paraaminosalicylic Acid in Treatment of Severe and Complicated Forms of Pulmonary Tuberculosis. P. Press.—p. 136.

Calcium Salt of PAS in Pulmonary Tuberculosis.—Eleven patients with pulmonary tuberculosis, of whom three had severe diabetes mellitus, one had hypertension and six had bilateral pulmonary tuberculosis of considerable extent with a progressive course, were treated with the calcium salt of paraaminosalicylic acid in pellets containing 60% of this calcium salt or 53.4% of the anhydride of paraaminosalicylic acid. The total daily dose of 10 to 14 gm. of paraaminosalicylic acid was administered in three divided doses in the morning, at noon and in the evening. Treatment lasted from six weeks to six months. The drug was tolerated well by eight patients and moderately well by three. Discontinuation of therapy was not necessary in any case. Digestive disturbances, which occurred in some of the patients, subsided spontaneously within eight to 10 days or after the simultaneous administration of sodium bicarbonate. Expectoration diminished rapidly and frequently disappeared completely in 10 of the 11 patients. A favorable effect of the drug on body weight, temperature and blood sedimentation rate was observed less regularly but frequently. Koch's bacillus disappeared from the bronchopulmonary secretions in five patients, although cavities were still demonstrated on tomographic examination in three. As a rule the roentgenologic picture was not much improved by the treatment. Although treatment with paraaminosalicylic acid is not a substitute for the classic methods of treatment (rest and collapse therapy) the calcium salt of paraaminosalicylic acid is to be considered a valuable adjuvant in cases of severe or complicated pulmonary tuberculosis. This salt is very well tolerated.

Presse Médicale, Paris

59:221-244 (Feb. 21) 1951. **Partial Index**

*Portal Roentgenography During Operation for Banti's Syndrome. P. Santy and P. Marion.—p. 221.
Leiomyomas of Esophagus and Their Treatment by Simple Enucleation. Chalnot, Faivre, Lochard and Hahn.—p. 224.
The Choroid Plexuses in Meningeal Tuberculosis. L. Bertrand and J. Salvaing.—p. 230.
*Vascular Graft in Thromboses of Aortic Bifurcation. J. Oudot.—p. 234.
Cheiloplasty by Pedicled Graft Removed from the Healthy Lip. C. Dufourmentel and P. Dufourmentel.—p. 237.

Portal Roentgenography During Operation for Banti's Syndrome.—Santy and Marion were able to corroborate the high incidence of extrahepatic obstruction in Banti's syndrome. They stress that in the course of an intervention for portal hypertension, verified manometrically, manual and visual exploration of the hepatic pedicle and of the portal system are often difficult and that with this mode of exploration, one is not always able to confirm definitely the intrahepatic or extrahepatic location of the obstruction of the portal system. For this reason the authors always examine the portal system roentgenographically in the course of operations for Banti's syndrome. After ligation of the splenic artery a Nélaton catheter is introduced into the splenic vein. The pressure in the splenic system is measured, and then 40 or 50 cc. of iodopyracet (diodrast®) or a similar contrast medium is rapidly injected in a 70 or 50% concentration. A picture is taken immediately after the injection and in patients with retarded circulation another is taken one or two minutes later. In 15 patients in whom this roentgenologic control examination was made in the course of the operation the obstruction was found to be extrahepatic in 10 and intrahepatic in five cases. Although the frequent extrahepatic blockages of the portal system simulate Banti's syndrome, they should be differentiated from it. There are stenoses (congenital) or thromboses (chronic pylephlebitis of the portal trunk or of the splenic vein). The term Banti's disease should be reserved for the intrahepatic obstructions with portal hypertension and splenomegaly in which roentgenologic examination shows the portal system to be intact. The etiology of Banti's cirrhosis remains obscure. The detection of splenomegalic cirrhosis at operation does not rule out extrahepatic obstruction. Certain portal stenoses are accompanied by cirrhosis, but to corroborate the diagnosis of Banti's disease a roentgenologic examination should be done during the operation. This paper is based on observations on 25 patients, 24 of whom were operated on. Surgical cure was obtained in 19 who were subjected to splenectomy with splenorenal anastomosis; the three who were subjected to splenectomy alone died. Two explorations were done for hemorrhagic relapse after splenectomy, and, of these, one died and one recovered.

Vascular Graft in Thrombosis of Aortic Bifurcation.—After having performed numerous vascular grafts on the aortic bifurcation in dogs, Oudot decided that this procedure should be possible also in human subjects, although he realized that periaortitis and the pathologic condition of the arteries would make the intervention more difficult in human subjects. He describes in detail the case of a woman, aged 51, with thrombosis of the aortic bifurcation. Simple arteriectomy was done on the right common iliac branch, while a vascular graft was done on the left. The abdominal incision and that in the left thigh healed rapidly, whereas that on the right, on which the blood supply was not correctly reestablished required much longer to heal. At the present time the patient has no trouble with the left leg, on which side the operation was complete. The result is less satisfactory on the right side, where a simple arteriectomy was done. Oudot uses preserved homografts for vascular grafts. He discusses other aspects of the operation, such as the method of suture, the anesthesia and particularly the indications for the operation and concludes that in case of thrombosis at the aortic bifurcation the main arterial circulation can be reconstituted by an arterial homograft.

Zeitschrift für klinische Medizin, Heidelberg

147:551-660 (No. 6) 1951

Evaluation of Liver Function on Basis of Its Metabolic Functions: III. Disturbance in Its Detoxicating and Eliminating Function. F. Hartmann.—p. 551.
Electrokinetic Potential of Blood Cells and Its Significance. E. Fritze.—p. 568.
*Why is Peptic Ulcer Rare in Pregnancy? H. H. Schmid.—p. 627.

Why is Peptic Ulcer Rare During Pregnancy?—Schmid mentions the greater incidence of peptic ulcer in men and points out that in women with peptic ulcer hypo-ovarianism is frequent. During pregnancy gastroduodenal ulcers are extremely rare. The following favorable influences on contributory causes of peptic ulceration occur during pregnancy: Dragging on the suspensory apparatus of the stomach is reduced because the stomach is pushed upward. The acid content of the gastric juice and the motility of the stomach are usually reduced during pregnancy. The tonus of the autonomic nervous system is also reduced; the hollow organs with nonstriated muscles and the abdominal vessels become dilated, and thus spasms are reduced. This dilatation is under the influence of progesterone and of the related (in chemical composition and effect) chorionic and placental hormones and of the chorion gonadotropin of the anterior pituitary. The changes taking place in the diencephalohypophyseal system during pregnancy presumably have a subduing influence on the various factors that favor the development of an ulcer; they may improve the blood perfusion of the abdominal organs and possibly exert a favorable effect on an existing gastritis. The author concludes that the profound changes caused by pregnancy will reduce or completely do away with the tendency to peptic ulceration. Women subject to peptic ulcer therefore could be permitted to become pregnant, provided there is no threat of severe hemorrhage or perforation. Moreover, in older women or even in men progesterone therapy or transfusion of pregnancy blood could be tried when other ulcer treatments have failed.

BOOK REVIEWS

Handbook of Child Guidance. Edited by Ernest Harms. [Originally issued in 1947.] Textbook edition. Cloth. $6. Pp. 751. Child Care Publications, 30 W. 58th St., New York 19, [1950]

Most books on child psychology, mental hygiene and a multitude of kindred subjects leave the reader puzzled if not frustrated. In many instances it is difficult for one to judge whether a given volume was written for popular consumption, for the social service worker, the psychologist, the physician, or whether it was intended as a "shotgun" combination to appeal to all readers. It is, therefore, refreshing to find a legitimate textbok that is directed primarily to the physician interested in the basic principles of child behavior.

This handbook follows an orderly plan with contents arranged in logical sequence. The subjects are well chosen and prepared by authors of foremost rank, true pioneers in mental health striving toward a better appreciation of the underlying psychology of juvenile conduct.

There are eight sections, starting with a history of the development of child guidance in the United States. This is followed by a discussion of the guidance of the normal child during its various age periods, with an excellent chapter on guidance of the superior child and the prodigy. The sections on guidance of the handicapped, the problem and the subnormal child cover the physiopathology, the psychopathology and the psychotherapy concisely and clearly with brief outlines of procedure, case studies and test methods.

The remaining sections include training for child guidance and social aspects and their various subtitles, with a discussion of various relations between the child and the multitude of factors that constitute his milieu. Of greatest interest is the discussion of the religious aspects of child guidance by writers representing the different faiths (Protestant, Catholic and Jewish), each contributing his respective philosophy of and background for child guidance. The last section deals with special viewpoints on the psychological concept of child life. Thus there is a chapter on Freud's psychoanalytic approach, Alfred Adler's viewpoint and childhood problems as seen from the analytic psychology of Jung.

The average physician interested in human behavior will find much to stimulate his thinking, because the volume is instructive. The pediatrician will find the handbook of great value not directly as a "how to do it" manual to be applied daily, but mainly as a reference book describing special techniques to be utilized in the rehabilitation of young patients in conflict with a confusing world.

Urologische Endokrinologie: Endokrinologie der Harn- und Geschlechtsorgane des Mannes und der Sexualität. Mit einem Anhang: Endokrinologie der Blastome. Von Rudolf Chwalla. Cloth. $13.80. Pp. 560, with 18 illustrations. Springer-Verlag, Mölkerbastei 5, Wien 1, 1951.

The author, a well known Viennese urologist, has collected with typical Teutonic thoroughness extant data on endocrine factors affecting the urinary and reproductive systems. He has not only integrated the vast body of knowledge in this field as gleaned from the literature, but he has also interpreted the data from the standpoint of his own experience gained from a study of the autopsy material available in Vienna. The chief defect of the book lies in the fact that the author apparently has had no access to the literature on the subject subsequent to World War II and is, therefore, out of date in those fields in which contributions have been made during the last decade. Nevertheless, he has integrated the subject so well and approached it with sufficient critical ability to make the book of value to the endocrinologist, as well as to the practicing urologist. The book is well written and printed but would have profited by the inclusion of photographs and other illustrative material.

The reviews here published have been prepared by competent authorities and do not represent the opinions of any official bodies unless specifically stated.

Militant Angel. By Harriett Berger Koch, R.N. Cloth. $3. Pp. 167, with illustrations. The Macmillan Company, 60 Fifth Ave., New York 11, 1951.

The genesis of this biography, which highlights the life and services of Annie W. Goodrich, is described in the preface, where Mrs. Koch tells of the vivid impression made by Miss Goodrich when she received a citation from the International Council of Nurses in Atlantic City, N. J. The book is divided into six sections containing a varying number of chapters. Miss Goodrich is followed through the formative years into the period when greater professional responsibilities were assumed, then on into an ever widening field that included activities at state levels and army service. In part 5, her work in elevating the educational and professional standards of nursing and her assumption of the deanship of the Yale School of Nursing are described. In the final section, retirement is placed within quotation marks to emphasize the fact that she continued to be a source of inspiration and help to friends and colleagues.

The book contains interesting photographic documentation of Miss Goodrich's life, and in an appendix are presented data on honorary degrees, special awards and the long list of important positions she has held. In addition to a bibliography, there is a special section of notes directing attention to items of a more personal nature. The book is indeed a stimulating and instructive story of the amazing advances that have been made by the nursing profession.

Sesiones dermatológicas en homenaje al profesor Luis E. Pierini. Trabajos presentados, Buenos Aires, 11 al 13 de noviembre de 1949. Paper. Pp. 521, with illustrations Lopez & Etchegoyen, S. R. L., Junin 863, Buenos Aires, 1950.

In 1949 a special dermatological conference was held in Buenos Aires in honor of Professor Luis E. Pierini of Argentina. Attending the conference were prominent dermatologists from North and South America and Europe. The scientific papers presented at these meetings were assembled to form this volume. The reports cover a wide variety of dermatological topics and include both experimental and clinical studies. Those dealing with allergic dermatoses are grouped together to form the first section of the book. Of particular interest among these is a review paper on experimental contact dermatitis, in which the authors discuss the histamine and hyaluronidase content of eczematous skin, the respiratory changes involved in the eczematous process and the inhibiting effect of topically applied dimercaprol (BAL) ointment on the process. The next group of papers deals with infectious and parastic diseases including histoplasmosis, coccidioidomycosis, American trypanosomiasis and oriental sore as seen in Argentina. Also reported are studies on antibody formation in kerion celsi and sporotrichosis. The following sections deal with venereal diseases, leprosy, "psychodermatoses" and cutaneous tumors. Of interest among the latter are the multiple arsenical carcinomas arising as a manifestation of chronic endemic arsenicalism in the province of Cordoba, Argentina. The volume closes with a section on miscellaneous dermatoses, followed by several papers on therapy. This compilation provides the North American reader with an interesting cross section of South American dermatology and, to a lesser extent, of European dermatology.

The Principles of Heredity. By Laurence H. Snyder, Sc.D., Dean of Graduate College, University of Oklahoma, Oklahoma City. Fourth edition. Cloth. $4.75. Pp. 515, with illustrations. D. C. Heath & Co., 285 Columbus Ave., Boston 16, 1951.

An extremely clear elucidation of this subject is provided in this contribution. As the author states, need for another revision after only five years is evidence of the rapid advances that are being made in this subject. The volume can be said to accomplish the aim stated in the preface to the first edition: that, in addition to being suitable for a college course in genetics, it is of interest to the general reader. Besides an extensive consid-

eration of the most important aspects of studies in heredity, there is an introductory chapter providing orientation, followed by chapters on Mendelian inheritance, crosses, sex-linked and lethal genes, the mapping of chromosomes and numerous other related topics. The genetics of domestic animals and cultivated plants are also discussed. Other important chapters are devoted to sex determination, the mutant gene in man, eugenics and analysis of family histories. Profusely illustrated with sketches, diagrams and photographs, including one in color on blood groups, the volume is printed in clear, well leaded type that is conducive to easy reading. It should have widespread appeal.

Symposium on the Healthy Personality: Transactions of Special Meetings of Conference on Infancy and Childhood June 8-9 and July 3-4, 1950, New York, N. Y. Edited by Milton J. E. Senn, M.D. Supplement II: Problems of Infancy and Childhood, Transactions of Fourth Conference, March, 1950. Cloth. $2.50. Pp. 298. Josiah Macy, Jr. Foundation, 565 Park Ave., New York 21, 1950.

To lay a factual background for the consideration of "healthy personality development of children and youth" and "how can we rear an emotionally healthy generation," a group of neuropsychiatrists, psychoanalysts, psychologists, pediatricians, obstetricians, anthropologists and sociologists met with members of the Fact Finding Committee of the Midcentury White House Conference and its staff. This volume is a stenographic report of the papers and discussions of these two meetings.

The first meeting concerned the discussion of a preliminary report on "Growth and Crisis" by Erik H. Erikson, a psychoanalyst with the Institute on Personality Assessment and Research of the University of California, Berkeley, Calif. He presented the criteria of a healthy personality in the eight stages of development at which he feels a person passes through a developmental crisis. His colleagues discuss his point of view very critically, with the hope of making his final report, which follows this discussion, more useful to the White House Conference.

The second session considered two presentations. "Constitutional and Prenatal Factors in Infant and Child Health" by M. T. Ashley Montagu of the Department of Anthropology, Rutgers University, New Brunswick, N. J., covered the information available on the effect of the prenatal environment on the subsequent emotional development of a person. The second, "Toward a Social Psychology of Mental Health" by Marie Jahoda of the Research Center for Human Relations, New York University Graduate School of Arts and Sciences, purports "to examine what is known and what should be known about the impact of community influence on the mental health of the individual."

The interesting part of this book is the profound discussion of developmental problems by scientists of widely varying education and experience. The semantic problems of interprofessional communication are clearly presented in the effort each participant makes to understand the thinking behind the words used. This book also presents an excellent overview of the thinking not only of these three authorities, but also of the many equally well informed members and guests of the conference.

Any physician concerned with children, particularly with their emotional growth and personality development, will find these carefully recorded conversations a stimulating experience. Many of the thoughts that the Fact Finding Committee presented to the Midcentury White House Conference had their origin in these two sessions recorded in this book.

Kurzgefasstes Lehrbuch der orthopädischen Krankheiten. Von Professor Dr. Peter Pitzen, Direktor der orthopädischen Universitäts-Klinik und Poliklinik (Hüfferstiftung), Münster i. Westf. Fifth edition. Cloth. 17.40 marks. Pp. 286, with 213 illustrations. Urban & Schwarzenberg, Thierschstrasse 11, München 2; Meinekestr. 13, Berlin W. 15, 1950.

This book is written for the general practitioner so that he may become acquainted with the commoner orthopedic conditions encountered. The author states that it is designed to help the physician obtain a clear conception of certain physical conditions, which "in a way have remained diagnostic stepchildren in spite of their relative frequency and significance in regards to public health."

The style of the text is termed by the author "telegraphic." He has used this style in previous editions, but on many occasions he abandons it to give place to fuller descriptions of symptoms.

The subject material is well chosen, although some conditions, such as severe congenital defects of the extremities, could have been omitted in favor of other commoner ones such as bone tumors. Osteoid osteoma, a pathologic entity, recently described and investigated, is not mentioned.

The chapter dealing with orthopedic conditions of the foot and hip is particularly well done. It is remarkable how much diagnostic material may be embraced in a few pages. In some instances, conservative procedures are overemphasized, procedures which in the present light of our knowledge can hardly be accepted or justified. An example in point is the statement that satisfactory correction of a scoliotic deformity may be achieved by "muscle power." Modern opinion disagrees with this.

Surgical interventions are only casually referred to, perhaps with some justification, because the work is intended for general practitioners. Some mention, however, should have been made of the modern surgical treatment of scoliosis. Important and frequent orthopedic conditions, such as ununited fracture of the femur, are not mentioned. The description of the surgical treatment of malum coxae senilis, which for some reason the author calls arthrosis deformans of the hip, is poorly presented. The illustrations are numerous and good. The radiograms are equally satisfactory. As a whole, the book is well written and may be read with benefit by the general practitioner who reads German. A bibliography would have enhanced the value of the work, particularly for the student.

Chirurgie esthétique nasale. Par Marcel Galtier. Préface de M. Bouchet. Paper. 2000 francs. Pp. 233, with 172 illustrations. G. Doin & Cie, 8 Place de l'Odéon, Paris 6e, 1950.

The first two sections of this book deal with development and surgical anatomy, respectively. The discussion of surgical anatomy, although inclusive, seems somewhat abbreviated in specific details. A section on artistic anatomy is interestingly presented. This part is very well written and cleverly presents variations in the nasolabial angle and classifications of the different types of profiles. An interesting discussion follows on the "photometer" and its relation to the various profiles. The different anomalies are also presented. Less than two pages are devoted to the physiology of the nose, which is probably the weakest section of the book. Sections on armamentarium and anesthesia are well done, as are the numerous procedures that are described to correct the various types of nasal deformities. Much space is devoted to preoperative and postoperative photographs. However, it would have been well in each instance to show both front and side views. The illustrations are well done and depict the procedures clearly. For anyone able to read French this book can be recommended as a good collateral source on the subject of nasal plastic surgery.

Personality and Psychotherapy: An Analysis in Terms of Learning, Thinking, and Culture. By John Dollard, Research Associate in Psychology (Professor), and Neal E. Miller, Professor of Psychology, Institute of Human Relations, Yale University, New Haven. Cloth. $5. Pp. 488, with 19 illustrations. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 18; Aldwych House, Aldwych, London, W.C.2, 1950.

This book is addressed to students, teachers and research workers in the fields of personality adjustment, abnormal psychology and psychotherapy.

The authors have attempted to bring together in integrated form recent thinking in the fields of psychoanalysis, experimental methods of natural science and modern sociology, and anthropology. The purpose is to establish an over-all psychologic basis for a general science of human behavior. In the hypotheses presented, the authors have drawn from the works of Freud, Pavlov, Thorndike, Hull, Sumner, Murdock, Kluckhohn and Warner. An attempt has been made to integrate a wide range of material, which includes the basic principles of learning, the understanding of socially learned drives, dynamics of conflict and the normal use of the mind in the solution of problems of childhood, neurosis and self study.

This book is a valuable contribution toward bringing about a unified concept of the fields mentioned as they relate to our culture.

The Amino Acid Composition of Proteins and Foods: Analytical Methods and Results. By Richard J. Block, Ph.D., Associate in Department of Physiology and Biochemistry, New York Medical College, New York, and Diana Bolling, B.S. Second edition. Cloth. $10.50. Pp. 576, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, 1951.

This edition brings to the reader a revision which includes advances in the analysis of amino acids since 1945. The extended use of microbiological methods has been a major development in this field actually from about 1943.

Whenever possible, several procedures are given for the estimation of each amino acid. Whenever identical results were obtained by two widely different methods, the author emphasizes the point with regard to the confidence that is engendered thereby for each method.

For the food faddist and inveterate meat eater, the author makes an interesting observation that an essential amino acid is essential whether it comes from animal or vegetable protein. On this basis, the conclusion is drawn that it is just as arbitrary to make a distinction between plant and animal proteins as it is to draw a distinction for the carbohydrates.

The relative values of chemical and microbiological assays are appraised. The author considers that a combination of the chromatograph and chemical methods will yield the most significant results in the study of the structure of proteins and peptides. The microbiological procedures, on the other hand, will probably be of most value in the routine analysis of foods and feeds.

To the physician, this treatise would demonstrate the tremendous work of the supporting sciences of chemistry and biology in the advancement of knowledge incident to the important public health field of nutrition, which is a potent and basic prophylactic tool available to medical practitioners.

In presenting to the average reader the widely scattered literature on methods and results of protein analysis, this publication serves a very useful purpose.

The 1950 Year Book of Drug Therapy (October, 1949-September, 1950). Edited by Harry Beckman, M.D., Director, Department of Pharmacology, Marquette University School of Medicine, Milwaukee. Cloth. $5. Pp. 566, with 88 illustrations. Year Book Publishers, Inc., 200 E. Illinois St., Chicago 11, 1951.

The major portion of this textbook is devoted to abstracts of drug advances in the various major branches of practice, with editorial comments to highlight controversial points. Possibly, the best portion of the book is its introduction, in which the editor reviews the advances in drug therapy during the decade 1940 to 1950 in a concise thoughtful resumé.

A plea is made for physicians to realize that the socioeconomic impact of increased life span requires emphasis to the public that this increased longevity and freedom from infectious diseases materially increases the capacity to work of our older generations. In the opinion of the editor, some method must be evolved to absorb the productive capacities of elderly persons into industry if we intend to resolve some of the difficulties of geriatric patients.

The Folklore of Sex. By Albert Ellis, Ph.D. Cloth. $5. Pp. 313. Charles Boni, 3 Grove Court, New York, 1951.

Uniqueness marks the manner in which this survey of modern attitudes regarding sex was carried out by Ellis, who, in dedicating the volume to Havelock Ellis, notes with regret that they are not related. After considering various approaches, he settled on the plan of scanning all popular mediums of mass communication for a one day period. The day selected by Ellis was Jan. 1, 1950. What he found relating to sex aspects in that extensive, even though one day, survey is reported and analyzed under various classifications. In part 1 he determines popular attitudes on extramarital relations, and in successive sections he covers noncoital relations, sex relations involving pregnancy, sex organs, desires and expressions, sex crimes and "perversions," and sex control and censorship. The sections vary considerably in length, some taking little more than a few pages. All are filled with direct quotations from daily papers, popular magazines—"slick paper" as well as the "pulps"—at all levels from family to cartoon and "laugh" publications, books, the legitimate stage, radio, television, and motion pictures. The findings constitute a surprising haul that will amuse some, shock others and move still others to "I-told-you-so" comments.

In addition to providing running discussion of what he culls from the array of sources consulted, Ellis has a special section on statistical considerations and another termed "Summing Up." Numerous tables are contained in the first chapter of the former.

Ellis has made an important contribution in this field, and, because it does not depend on interviews or personal opinions other than those of the researcher, it can be accepted as more enlightening than many other sex surveys. After accompanying Ellis on his tour, one must conclude that sex is an important subject, since there is so much of it being constantly paraded. The author suggests three eventualities: learning to tolerate the present contradiction between liberal and conservative views, further liberalization in that respect, or a return to a distinctly conservative attitude. He offers no opinion as to what it will be.

In a bibliography are listed all the sources consulted, and it is an imposing array.

Bases of Human Behavior: A Biologic Approach to Psychiatry. By Leon J. Saul, M.D., Professor of Clinical Psychiatry, University of Pennsylvania School of Medicine, Philadelphia. Cloth. $4. Pp. 150, with 8 illustrations. J. B. Lippincott Company, 227-231 S. 6th St., Philadelphia 5; Aldine House, 10-13 Bedford St., London, W.C.2; 2083 Guy St., Montreal, 1951.

This book presents an introduction to the basic theories of dynamic psychiatry and considers the relation of these theories to present day concepts of physiology, with particular reference to new theories concerning the physiologic effects of stress. Stress is considered to be either a reactive type arising from the conflict of a person with his environment, or an inner type arising from basic emotional conflicts that develop in childhood. An attempt is made to follow the impact of psychic and emotional tension through to physiologic end-point reactions on body tissues. The style of the book is simple and clear. It should be of considerable value to beginning students of medicine in clarifying the theoretic concepts that underlie the expanding field of psychosomatic medicine.

Taschenbuch der Anatomie. Band 2: Gastropulmonalsystem (Verdauungs- und Atmungsorgane), Urogenitalsystem (Harn- und Geschlechtsorgane), Gefässsystem. Von Professor Dr. med. Hermann Voss und Dozent Dr. med. habil., Dr. phil. Robert Herrlinger. Third edition. Half-cloth. 12 marks. Pp. 340, with 204 illustrations. Gustav Fischer, Villengang 2, Jena 15, Germany, 1950.

This admirable little book measures only 118 by 158 mm. Nevertheless, it covers the gastrointestinal, respiratory, urogenital, cardiovascular and lymphatic systems with precision and in detail. The 204 diagrams are all labeled with unabbreviated names pointing directly to the intended parts. It has a good index and even a short bibliography. All this is achieved, by some miracle of the printer's art, without sacrifice of legibility in either text or legends. The book will be handy for anatomy students who can read German, and it should also be studied as a remarkable example of pocket-sized textbooks of good quality.

Facts About the Menopause. By Maxine Davis. Cloth. $2.50. Pp. 172. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 18; Aldwych House, Aldwych, London, W.C.2, 1948-1951.

The purpose of this volume is to prepare the woman approaching the menopause for this transitional period in her life. The many misconceptions prevalent in our folklore concerning the climacteric are discussed, exposed to scientific analysis and disposed of as largely false. The physiology, endocrinology, symptoms and usual treatment of the menopause are reviewed in simple, understandable language. Questions concerning libido, sex life and personal hygiene are answered. The author gives too much prominence to the climacteric in men when one considers the relatively low incidence of the syndrome in men as compared to women. The book makes good reading for the physician to recommend to his menopausal patients.

QUERIES AND MINOR NOTES

ABSCESSED TEETH

To the Editor:—*I frequently see children with swollen jaws resulting from abscessed teeth. They seem very ill. They have been to their dentist, but he tells them to wait, as the tooth cannot be pulled until it "cools down." Is it not true that pus anywhere should be drained promptly and that with antibiotics there is much less danger of septicemia if the tooth is pulled than if the tooth is left in? Many dentists do not know how to use penicillin. Should they not pull such a tooth and refer the patient to the physician for antibiotic treatment? Is it that important to save an infected tooth, for alignment's sake, that a child should be allowed to suffer so many days? I would appreciate some discussion.*

David Hoehn, M.D., Holdingford, Minn.

This inquiry was referred to two authorities, whose respective replies follow.—Ed.

Answer.—The above question illustrates one of many instances wherein the patient will benefit by the cooperative efforts of the dentist and physician. Prior to the advent of the antibiotics, teeth were not usually extracted during the acute phase of such an infection, although when indicated incision and drainage of abscesses were performed. Today with adequate preoperative and postoperative antibiotic therapy, extraction of the offending tooth when necessary is usually not contraindicated. Many dentists prefer not to administer drugs parenterally and consequently welcome the cooperation of the physician. The physician, however, should have the opportunity to examine the patient and prescribe and administer proper medication preoperatively. Such infected teeth most often cannot be saved. Obviously the tooth must be sacrificed if the patient's health is endangered. The deciduous and first permanent molars are the most frequent offenders. Although early loss of these teeth may lead to malocclusion, it can be prevented by maintenance of the space created by loss of the tooth by means of a dental appliance.

Answer.—There can be little question that gums should be drained by incision as soon as one is sure pus is present. Often the infected tooth may be removed at the same time, but sometimes this procedure must be delayed until cellulitis of the soft parts has subsided and there is definite evidence of localization. There is no question, also, that depot penicillin in doses of at least 400,000 units one hour before the time of surgery offers considerable protection against bacteremia. In case of badly infected teeth, the depot penicillin should be repeated at intervals of eight to 12 hours until the infection has subsided. The decision as to the time of the surgical procedure should be the joint responsibility of the extractionist and the physician. No infected tooth should be retained for the purpose of alignment or for any other reason.

NECROBIOSIS LIPOIDICA DIABETICORUM

To the Editor:—*Is there any new therapy for necrobiosis diabeticorum?*

M.D., New York.

Answer.—There is no specific therapy, new or old, for necrobiosis lipoidica diabeticorum. Careful control of the diabetic condition, local cleanliness, watchful waiting and protection of the affected area to prevent further injury are best measures. Long years of observation show that almost invariably the lesions subside eventually and a few so completely as almost to obscure the original lesion. Even the worst cases improve, but time appears to be the factor of chief importance.

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any official bodies unless specifically stated in the reply. Anonymous communications and queries on postal cards cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

CHEST PAIN FOLLOWING INHALATION OF COLD AIR

To the Editor:—*A 50 year old man complained of severe pain in his chest on inhalation of cold air, followed many times by hemoptysis. His chest x-ray appeared within normal limits as did the cardiac shadow. Bronchoscopy and bronchograms disclosed no abnormalities. Smears were made from the bronchial tree; cytological study did not disclose cancer or other abnormality. I would appreciate any help in diagnosis and treatment that might be followed.*

W. H. Brady, M.D., Gooding, Idaho.

Answer.—The problem presented in the case reported is somewhat obscure. There are persons who react violently to too much cold air. This has been designated by some allergists as cold allergy, or allergy to physical agents. It seems to be an oversensitive condition of the bronchial mucosa, or the nerve endings in the bronchial mucosa.

Of recent years there has been a great deal of information obtained about virus infections of the bronchi. Many of these infections begin in the mucosa and cause a profound irritation, with reaction to cold air. If there is access to a good virus laboratory, a sample of the sputum should be studied for virus.

The treatment of either one of these conditions would be essentially the same. If virus proves to be causative, aureomycin may help. In severe virus infections of the bronchial tree, however, an immediate transfer to a warm climate has been found to be effective. If this is not possible, an air-conditioned, warm room is advocated. Otherwise, the patient will have to be treated by the ordinary heating facilities available, and with hot packs when the irritation becomes too severe, with the possible addition of sedative cough mixtures.

EXOPHTHALMUS

To the Editor:—*Has there been anything found that will help exophthalmus following hyperthyroid? A patient was subjected to thyroidectomy April 17, 1950. The present basal metabolic rate is + 8. The patient has chronic irritation of the conjunctivas probably due to exposure to air.*

Eugene C. Lowe, M.D., Miami, Fla.

Answer.—The exophthalmos that accompanies Graves' disease is not the result of the hyperthyroidism itself; hence removal of the thyroid does not as a rule cause any striking change in the exophthalmos. The same is true of treatment with radioactive iodine or with the antithyroid drugs. Oftentimes the appearance of exophthalmos improves, because after correction of the hyperthyroidism the widening of the fissures decreases, but the actual position of the eyes usually remains about the same. Conjunctival irritation is due to failure of the lids to close, and this oftentimes can be corrected by tarsoplasty, in which the corners of the lids are sewn together to narrow the aperture a little. Boric acid ointment can be used under the lids; if edema is present it is wise to advise the patient to sleep in a sitting position. The eyes should be shielded from the wind at all times.

FRUIT JUICES AND ATOMIC BURNS

To the Editor:—*Are orange and grapefruit juices contraindicated in the treatment of burns, atomic or otherwise, because of the high potassium content of these juices? Can you refer me to literature on this subject?*

May R. Mayers, M.D., New York.

Answer.—There is no present evidence that orange and grapefruit juice are contraindicated in the treatment of atomic burns. Studies on potassium levels in burns have been done by Moore, Longohr, Ingebretsen and Cope (*Ann. Surg.* **132**:1, 1950) and Crossweller, Farmer and Franks (*Brit. M. J.* **2**:242, 1950).

SUBSTANCES USED TO STIMULATE FIBROUS TISSUE

To the Editor:—*To what extent is polyethylene (polythene®) being recommended in surgical cases requiring fibrous tissue formation? Have any studies been published on dicetyl phosphate in human subjects for the same purpose (fibrous tissue formation)? Are any other substances being used to stimulate fibrous tissue formation? I am familiar with results published on polyethylene in hernia and aneurysm; has it been used for any other conditions?*

Nelson Libanio, M.D., Rio de Janeiro.

Answer.—Polyethylene is being used frequently by a number of investigators and clinicians as a vehicle or framework for holding irritating substances in place in an area of the body where fibrosis is desired. The use of polyethylene in this role as a support for irritants represents only a small fraction of the clinical use of the material, most of which is employed in its pure form to avoid any foreign body reaction. This inert property of pure polyethylene permits its use as temporary or permanent prosthesis in reconstruction of strictures or defects in large arteries, bile ducts, bronchi and interventricular cerebral ducts as well as nonirritating coverings for the brain, tendons and similar situations where fibrosis would be harmful. Polyethylene film has been recommended for use as a protective sheath under metal bands used to progressively constrict large arteries. This sheath prevents pressure necrosis of the vessel wall at the edge of the metal band according to P. C. Shea. A search is being made now for suitable absorbable substitutes for polyethylene, which represents a permanent sheet of nonabsorbable material. The gradual absorption of this film would avoid complications such as reoperation for removal of the polyethylene, which may prevent healing when an infection occurs, as has been reported in one instance.

Dicetyl phosphate has been isolated by Yeager and Cowley as the irritating factor in the original impure polyethylene manufactured by the solvent cast process, the use of which has been discontinued by some manufacturers. Pure polyethylene film is now being impregnated with dicetyl phosphate powder by rubbing of the powder into the film while it is softened by heating. Difficulty has been encountered in sterilization of the polyethylene film without removal of the water and alcohol soluble dicetyl phosphate. Repeated phosphate analysis of both the film and the sterilizing solution by Dr. W. R. Todd of the biochemistry department at the University of Oregon Medical School indicates that soaking the impregnated film in 1: 1,000 aqueous benzalkonium chloride solution for 20 minutes removes less of the dicetyl phosphate than other methods of sterilization. Although dicetyl phosphate has been used in a number of patients for production of fibrosis, there appear to be no published data on postmortem findings in humans. Yeager and Cowley, as well as Poppe, have observed a pronounced fibrous tissue reaction around the dicetyl phosphate in dogs.

Substances other than dicetyl phosphate that have been used to stimulate fibrous tissue are numerous. Cellulose hydrate, the common type of cellophane, is probably the most frequent, but the variable factors and sizings used in its manufacture have made its reactions somewhat unpredictable. Asbestos powder, as recommended by Claude Beck for creating vascular adhesions in the pericardial cavity, has been used clinically, but here again the irritating properties of asbestos vary with the manufacturing process. Talcum glove powder has been shown by a number of investigators to produce intestinal adhesions and has been used by Poppe when a small aneurysm has been encountered unexpectedly and other preparations were not readily available. Rosaniline dye has been used in animals to produce fibrosis but, as indicated by early animal experiments (Poppe and Renault), proved too toxic for clinical application.

Polyethylene containing dicetyl phosphate has been used primarily in reinforcing aneurysms and hernia repair. Other uses consist of wrapping it around the patent ductus or carotid artery in cases of cerebral aneurysm to produce slow but progressive development of strictures and stenosis.

HAIR DYES

To the Editor:—*A patient requested information on a reliable hair dye. I was unable to help her, and I did not wish to suggest any one product without the opinion of the American Medical Association.*

Wilfred Yoslow, M.D., New York.

Answer.—Certain general precautions are indicated in the use of most hair dyes. While the incidence of unfavorable reactions is low, they do occur and they are usually due to the lack of adequate directions for use, carelessness on the part of the user or a sensitivity that could not be predicted by present measures. Suggestions for maximum protection against unfavorable reactions are as follows: No hair dye should be used where lesions are present on the scalp; no hair dye should be permitted to get into the eyes, and directions should be followed carefully.

In general, three main types of dyes are available. Vegetable dyes, the most popular of which is henna, are among the safest. Cosmetically speaking, the disadvantages are such that their use is limited.

Metallic salt hair dyes are particularly popular for home use. Although the cosmetic results may not be entirely satisfactory, indications at present are that metallic salts are not absorbed through the intact skin. Possibly a serious reaction to a metallic hair dye would result if repeated small amounts were to enter the blood stream over a prolonged period through scalp lesions, through careless oral ingestion or through the mucous membranes. No report is available that establishes a metallic salt hair dye as the cause of metallic salt poisoning.

The aniline type of hair dye is probably the most effective and is also the greatest potential health hazard. Among the most extensively used are paraphenylenediamine and paratoluylenediamine. The Food, Drug and Cosmetic Act of 1938 prohibits the use of any of these dyes in eye make-up, because of serious reactions which resulted prior to that time from their use in eyelash dyes. Furthermore, these dyes are relatively frequent sensitizers, and a caution statement on the labeling to this effect is required by the foregoing law. In addition, directions must be included for a skin test to be executed before each and every application of the dye.

Another type of dye, which is not so commonly used, is the sulfonated azo type dye. Indications are that these may be safer than other coal tar dyes, but several applications are usually necessary to obtain the shade designated.

While certain hazards obviously exist in the use of hair dyes, the number of reported cases of reactions is small in relation to the number of persons who use hair dyes, rinses and other hair coloring agents regularly. Reactions can be kept to a minimum by strict adherence to directions and general precautionary measures.

TREATMENT OF CANCER OF OVARY

To the Editor:—*I removed a 2,240 Gm. ovarian tumor with a pathological diagnosis of papillary pseudomucinous adenocarcinoma of the ovary, grade 2. I also did a complete cleanout of the patient's pelvis. Numerous seedings were present over the peritoneum. The stitches were removed, and x-ray therapy was begun a day later. Would you advise further palliative therapy in the form of testosterone proprionate? If so please outline dosage, frequency and duration. When should this therapy be started?*

W. J. Hill Jr., M.D., Shreveport, La.

Answer.—Total removal of the uterus, tubes, ovaries and omentum, with excision of all implants followed by deep therapy is the accepted treatment for this type of malignancy. There have been no reports of successful therapy with the use of testosterone propionate. If it were to be utilized, it should be given in doses used for the effective treatment of metastatic breast cancer, namely, 50 mg. three times a week for a total dose of at least 1,200 mg. If following this there has been improvement, maintenance therapy should be continued indefinitely. The treatment, if employed, should be begun at once.

WHOOPING COUGH VACCINE AND ENCEPHALITIS

To the Editor:—*Recent reports indicate that some few children may get encephalitis following the injection of whooping cough vaccine as a separate injection or mixed with either tetanus or diphtheria. I have been unable to find any such reports. Do you know of any such cases?*

W. Price Killingsworth, M.D., Port Arthur, Texas.

Answer.—Among the 15 cases of encephalitis following the injection of pertussis vaccine reported by Byers and Moll (*Pediatrics* **1**:437 [April] 1948) the vaccine combined with diphtheria or tetanus toxoid, or both, was administered in three. It should be remembered that most of the cases in the foregoing series occurred in a 10 year period when triple antigens were not available. More recently Anderson and Morris (*Lancet* **1**:537 [March 25] 1950) and Vahrman (*Brit. M. J.* **2**:608 [Sept. 9] 1950) have reported encephalitis after injections of combined diphtheria and pertussis antigens. However, there seems to have been no instances recorded lately when triple antigens were used.

FORMULAS FOR DETERMINING BASAL METABOLIC RATE

To the Editor:—*My records include two formulas which have been employed in determining the approximate basal metabolism of a person from his blood pressure and pulse rate: BMR = (PP + PR) — 111; BMR = 0.683(PR + 0.9 PP) — 71.5. Could you please advise where these formulas first appeared and what, if any, practical value might be placed on them?*

I. Jacques Yetwin, M.D., Springfield, Mass.

Answer.—The formula BMR = 0.683 (PR + 0.9 PP) — 71.5 is one suggested by Read (*J. A. M. A.* **78**:1887 [June 17] 1922; *Arch. Int. Med.* **34**:553, 1924).

The formula BMR = (PP + PR) — 111 is a modification of the Read formula made by Gale and Gale (*Lancet* **1**:1287 [June 13] 1931).

An excellent criticism of these formulas has been given by Eugene Du Bois (Basal Metabolism in Health and Disease, ed. 3, Philadelphia, Lea & Febiger, 1936, pp. 340-342).

CHRONIC SINUS INFECTION

To the Editor:—*What is the consensus among specialists in diseases of the nose, throat and ear and in roentgen therapy concerning treatment of chronic sinus infection and/or lymphoid hyperplasia of the nose and throat in children aged 3 months to 8 years? In the hands of a competent roentgenologist is there danger of damage to the eye and the optic nerve, to the ear and the eighth nerve?*

J. Reginald Myers, M.D., Everett, Pa.

Answer.—Roentgen therapy for the conditions mentioned is helpful, and results are often gratifying. When the worker is an expert, damage to the eye and its optic nerve or to the ear and its nerves would be almost impossible. The doses normally used are not such that they can harm these or any other structures in the area.

HIRSUTISM

To the Editor:—*A girl 20 years old, single, has excessive hirsutism of the face and upper lip. Menses are fairly regular (every six weeks). She began menstruating at age 13. Would doses of estrogens, 1 mg. of diethylstilbestrol every day for two months, do anything toward removing the excessive hair growth? There is no evidence of ovarian or adrenal tumor.*

Lewis W. Berry, M.D., Chelan, Wash.

Answer.—The problem outlined is a common one and usually very distressing to the afflicted person. The following procedure is suggested:

1. Careful history and physical examination, menstruation at regular intervals, normal development of the breasts and external genitalia, absence of enlargement of the clitoris and absence of change in the voice suggest that a masculinizing tumor is not present.

2. At least three determinations of the 17-ketosteroid excretion in the urine on different days to exclude the possibility of excessive production of androgen.

3. If no masculinizing tumor is present, the administration of estrogen in large doses will inhibit the growth of hair but will not cause it to fall out.

4. It is probably desirable to remove the hair on the face by electrolysis.

ANESTHESIA AND QUININE IN OBSTETRICS

To the Editor:—*In* The Journal *of Feb. 17, 1951 (page 530) are two queries on obstetric problems, "Saddle Block Anesthesia in Obstetrics" and "Use of Quinine During Pregnancy." I disagree with some of the statements in the answers. 1. Regarding the use of saddle block anesthesia in obstetrics, the statement is made that this type of anesthesia "merits an important position in the management of premature labor, toxemia and certain instrumental deliveries—particularly the posterior position of the occiput—insuring against anoxic depression of the infant from general anesthetics." While agreeing with the other points I disagree with the recommendation that it be used in posterior positions of the occiput. For various reasons its use in these positions is found to further complicate the picture, except when the cervix is fully dilated and the head is well down. This has been observed repeatedly by my associates and me, both in private practice and in our service at Charity Hospital, where the method was first employed by Adriani and his associates of the department of anesthesia. 2. Regarding the use of quinine in the treatment of malaria during pregnancy and lactation, we have not hesitated to use it by mouth in the usual dosage. There is no advantage in its use by injection. I doubt that it has any stimulating effect on the pregnant uterus; this view is supported by numerous pharmacologists. Its employment as an agent to induce labor has been discontinued because it has been found to be of no value. In larger doses, it may cause the death of the fetus in utero. In the doses used in the treatment of malaria, it might affect the hearing apparatus of the fetus but has not, as far as is known, produced fatal effects. For these reasons, efficient substitutes for quinine are advisable in the treatment of malaria in the pregnant woman.*

E. L. King, M.D.,
Professor of Obstetrics, Emeritus,
Tulane University,
New Orleans.

VISUAL ACUITY OF A TEACHER

To the Editor:—*In the answer in* The Journal *(March 10, 1951, page 774) to the query on "Visual Acuity of a Teacher" an erroneous recommendation is made, to the effect that a teacher with low visual acuity would be especially well adapted for teaching sight-saving classes. Having observed the work of many teachers of children with partial sight all over the United States, I am convinced that such a teacher would be at a great disadvantage. Although many school books are available in 18 point type, the variety of books so available is limited. It is necessary in every class of children with partial sight that the teacher secure other books and publications, including newspapers and news magazines, printed in 10 point, 8 point and even smaller type, which are often of particular interest in education. The teacher of children with partial sight, therefore, needs particularly good vision to interpret to the children material that they cannot read. Often the teacher types the most significant of such material, using a bulletin board typewriter, so that it may be available to the children. This she would not be able to do if she were seriously handicapped visually. Persons with such handicaps should not be encouraged to consider themselves "especially well adapted" for teaching children with partial sight.*

Franklin M. Foote, M.D.,
Executive Director
National Society for the Prevention of Blindness,
1790 Broadway, New York 19.

John W. Cline

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